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Syme Memorial Lecture.[1]

SINCE SYME: TRANSFORMATION AND DISSOCIATION.

By W. G. D. UPJOHN,
Melbourne.

WHEN the offer was made to me of delivering the ninth Syme Memorial Lecture, I naturally considered it an honour that I should be thought worthy of being one in the succession of medical practitioners privileged to make their contributions to preserving for later generations the memory of George Adlington Syme.

He was born in England in 1859, nearly a century ago, came to Victoria as an infant and lived his long and useful life in this State. The story of his life has been told in previous memorial lectures, and fortunately there are still a few in the audience who knew him personally. They will agree with me that no medical man in our time, in Australia, has been held in greater respect than he was, and it is fitting that the memory of a man of so remarkably fine a character should be kept alive in our profession.

[1] Delivered at a meeting of the Victorian Branch of the British Medical Association on April 1, 1953.

Not only was he a wise and able surgeon, he was also a great citizen with broad interests and a strong sense of public duty: a man of integrity honoured and respected throughout Australasia and beyond. He had seen and had assisted in many of the great changes in medical affairs in his own lifetime, others he had foreseen, and some undesirable changes he had tried hard to check. Of these I have heard him speak both in council and in private conversation. In 1924 he retired from general surgical work, and five years later he died.

It was not until I came to think about composing this memorial lecture that I realized a generation had passed since he was with us. This made me think of how much or how little remains, at the present time, of what constituted medical activities in his era, and how much these activities are shaping the present and near future.

When we are travelling on life's highway, actively employed and intent on our various interests, we are not acutely conscious of changes going on around us, unless they are of a startling nature. It is only when we have time to pause and look back that we are likely to notice the transformation in the appearance of surroundings which has occurred while we have been on our journey, and can discern something of the general direction of the road along which we are going.

When I was a child, one of the joys associated with the annual summer holidays was a visit to the pantomime. This was long before the cinema was thought of, and the

juvenile sense of wonder and pleasure in simple delights was unspoiled. The great thrill and chief spectacle of the show was called "the transformation scene".

The curtain rose on a stage displaying some pleasing conventional scene, and then, as we watched the beautiful fairy queen wave her magic wand, the scene slowly and marvellously changed. Great and gorgeous flowers unfolded from stage vegetation in the woodland scenes, and, as their glittering petals opened out, fairy creatures emerged from them to float across the scene. What seemed like tree trunks broke apart to become dissociated to form parts of a gorgeous palace, and so on, in a bewildering way, till the whole scene was transformed before our eyes into a beautiful and wonderful spectacle, with little resemblance to the original.

True, certain parts of the original could be recognized here and there, having undergone a sort of transition or evolution into the components of the final scene.

There were still the demon king and his noxious associates lurking in the shadows, in evil opposition to the power of the fairy queen, acting as constant threats to the safety of the beautiful buxom principal boy, who strolled about the stage in a seemingly aimless fashion, but really giving a very effective anatomical demonstration of her wonderful chest and leg development.

She did not seem to be essential to the scene; but now I suppose that she was introduced into it to add to its glamour and to relieve the boredom of the uncles and other adult males in the audience who had taken the juveniles to the pantomime.

Other scenes left no vivid impression till the pantomime finished with the rapidly acted, crazy and incomprehensible harlequinade.

This period of the last forty years or so now under review has had its transformation scenes with its brightness and beauty, the successes of its good fairy and the powers of light, its dark episodes with their demons and powers of darkness, the breaking up of old old associations and things that seemed permanent with the formation of new ones from them, till now we have reached the stage of watching (without much enjoyment) the confusion of the harlequinade of modern times, hopefully wondering whether it will all end as well and cheerfully as it did in the old-time pantomime.

As I reviewed in my mind the bygone scenes of the past, my thoughts turned to the state of affairs, political, economic, social and medical, in the State of Victoria when as a student I first made the acquaintance of George Syme in the wards of the Melbourne Hospital (1908).

Many changes have occurred since then, some great, some surprisingly little, some beneficial, some apparently not good, and it seems likely that further changes will take place more rapidly in the next decade.

An examination of the direction of changes in the last forty years might give us an indication of how we should direct our efforts, now and in the near future, to attain improvements on what has already been achieved.

It may be fitting at this stage to say something of the worldly environment of a Melbourne medical student in 1908, so that you can compare it with your knowledge of the present. He had grown up in a State which, during his school days, had federated with the other States of Australia to form the Commonwealth.

Owing mainly to the powerful advocacy of Syme's uncle, David Syme, of *The Age*, Victoria had adopted a policy of protection, before Federation, but secondary industry had not yet developed greatly. Australia was still dependent on Britain for the most part for manufactured goods, and very much dependent on Britain for defence.

Defence was given little thought then, for we had unshaken faith in the protecting power of the British Navy. War seemed a remote possibility in any case, and the idea was general that war would be so expensive that no sane nation would continue such a war for more than a few months. We were either mistaken in thinking such a nation existed, or our ideas of what constituted a sane nation must have been vague and incorrect.

Britain was then the supreme world power, and we grew up in the peace and security which her power and prestige caused to be maintained over so wide an extent of the world.

Britain was called "The World's Policeman", and she certainly maintained law and order to the benefit of the world generally. Though other nations disliked or envied her, there is no doubt that the world was then, for people of all races and nations, easier and safer to move about in than it is now.

We had the feeling that we lived in a liberal and secure civilization. We knew it had some obvious defects, but we thought these would soon be eliminated by the help of "science" and the prevailing and increasing goodwill which seemed to exist at that time.

Society seemed so stable that one felt no anxiety about the ability to carry to fruition reasonable plans made for one's future.

The period of the great land boom of the late eighties—an example of mass insanity with grandiose delusions—had brought disaster to many Victorians, and a long period of financial depression. Some of the younger men had gone to Western Australia and made money with the opening up of the goldfields of Coolgardie and Kalgoorlie. The money they sent to their families in the east was helpful to Victoria's recovery.

The shock of the collapse of the boom had a long-lasting and sobering effect on Victorian public finance. University finance was cramped and has never been easy since the land boom.

On the whole, it can be said that young people about 1908 had grown up in a world calmer and steadier than it is today. It was the Edwardian calm before the Georgian storms.

Since then, two great wars have disintegrated the British Empire, and great economic, social and political changes have followed. Two generations have come to maturity in a fast-changing environment. Both in the family and in public affairs this environment has become increasingly restless, expensive, unstable, and subject to tensions which have combined to bring about more nervous disorders, of various manifestations, than were evident in the adult population at the outbreak of the first World War.

Later I shall return to this matter, in speaking of the need, in our present medical training, for greater attention to be paid to the recognition and treatment of the nervous and mental factors in diseases and disabilities of all sorts. In the past we have put the emphasis on the physical aspect of disease and injury. Mind and body must be associated in our concept of a patient, more so now in these days of stress and uncertainty than in the peaceful, quieter times of the past.

We of the medical profession are part of a larger community, and with the alterations in the political, economic and social ideas of the community, necessarily there must be changes in our profession also, both in its relation to society and to institutions, and in its own education, economy and organization.

As the profession is traditionally conservative and is still individualistic, it is not surprising that changes in the affairs of the profession, apart from matters of science and technique, have been proportionately less than in the general community and have tended to lag.

Some of the changes which have occurred have come through outside pressures and not from plans originating in the profession itself.

Generally speaking, in the past, a medical practitioner's life was physically too fatiguing for his own good, but it was the tradition that, like a priest, he must subordinate his own comfort and well-being to that of the fellow creature seeking his help.

Sometimes patients took a selfish advantage of this; but the profession was honoured and held in high public

esteem, because it was manifest to all that its members practised this ideal.

Group practice and other private arrangements have quite properly lessened the burden for many a practitioner, but these arrangements are not always carried out as satisfactorily as they might be for a patient's welfare and convenience.

The patient who has been used, over a period of years, to getting attention from one doctor, who is well acquainted with his illness and general medical history, dislikes the uncertainty as to which member of a group practice is likely to see him at his next visit. Some patients do not mind, but a number do, especially if the group practitioner shows that he has not been instructed in matters of past history and treatment. Also one hears too often of patients in the suburbs, in an emergency, having much difficulty in securing medical attention at night, or at a week-end or on a holiday. It is as likely as not that when a doctor does attend he is one of the older practitioners still surviving in the district.

These things are unnecessary and are not good for our reputation. They help to add to the criticism of and ill-will towards the profession as a whole, which are being expressed too often by some sections of the public. They could easily be rectified by a voluntary arrangement among the practitioners in the district, and a move to do this could well be initiated by some of our local sub-branches. If we do not make such arrangements ourselves, we shall find an unsympathetic or hostile outside authority imposing compulsory and irksome regulations on us.

Individual doctors are still held in affection and esteem by their own patients, but I am sure that the public esteem of the profession generally has declined considerably in the last thirty-five years.

This loss of prestige is ascribable to a slight extent to acts of some medical men whom we ourselves do not hold in good repute; some is due to policies and acts of our association not in harmony with public opinion, but most of it is due to continued and uncontradicted hostile propaganda by groups ill disposed to our profession for a variety of reasons.

Alterations which have occurred in the organization and administration of our medical society, and changes in hospital organization, administration and staffing are all interesting in so far as they indicate future trends. However, predictions are notoriously liable to error.

In our State, as elsewhere, we must recognize that many activities that were formerly considered private or individual have now been partly or completely nationalized.

In our profession, the older men and many in the near-middle-age group, with established practices, still desire to retain medical practice as a private affair. This is not to be looked on as something selfish on their part, for there is a tremendous amount of what is good for the public, not to be measured in material terms, in medicine practised as it has been for generations in the form of private practice. Many patients are aware of this, and are as averse to the change to nationalization as are their physicians.

On the other hand, there is no good ignoring the fact that there are many who do not care much who gives them medical attention, so long as it is prompt, apparently reliable, and accompanied by ordinary courtesy. If in addition they can get it without it being apparent to them that they are paying for it, the arrangement seems to them really good, and preferable to attendance by a private practitioner.

Furthermore, there are increasing numbers of students and young graduates who believe in nationalization in principle, though they may have some doubt and difference of opinion concerning the ways of putting it into practice.

There is a widespread uneasy feeling that, for political reasons, not what is best, but what is most expedient, may be the outcome. As it appears to me that nationalization in some form will come soon, I think we should not waste our means and energy fighting the principle, but should employ them in striving to get it adopted in a form which is best for the public and ourselves. Otherwise we shall get it in a form which will attract most votes for this party or that, or in a form which the impressionable public will be persuaded by propaganda is the form which the public strongly desires.

We could spend our energies better in active and persistent efforts to ensure that a national scheme, when it does come, will provide such conditions in the service that it will attract to it young students and graduates who can feel that the practice of medicine will still be an honourable calling, retaining the high ideals which characterized the best of their predecessors; that it will be a corps of distinction, something more than a branch of the public service with satisfactory remuneration and hours of work. It must embrace all forms of medical activity, so as to make use of men and women with special aptitude for administration, practice, research, public health, teaching and so on.

It is not going to be easy for our association to obtain such conditions. It seems to me that it needs the active continuous work of a selected few in our association, led by a trusted leader who should be given executive authority and power; something like the arrangement of a chief commissioner with his assistant commissioners.

Hitherto our efforts have been carried out at a disadvantage, through administrative machinery not originally designed for quick executive action. Committees, both State and Federal, are at a disadvantage in a contest when faced with the necessity of rapid independent and decisive action. They are in the unhappy position of usually being a move behind their opponents, of having to act on the defensive, and of being unable quickly to make fresh plans and act on them till they have been assured of the united support of Branches and members.

Our organization is democratic; but a big committee is unsuitable for quick decisions and prompt action. Time after time the opportunity for effective action has been lost because it took time to get a committee together, and to wait for its deliberations to reach a conclusion. By the time the conclusion had been approved and accepted, our opponents had carried out some act quite contrary to our ideas and desires. We then had ample time to make a strong united protest, which, however, had no effect in altering what had been done, or in preventing a similar occurrence later.

At the time when I first came in contact with Syme as a student in his surgery class about 1908, some general practitioners took a considerable part in teaching at the Melbourne Hospital, which was then the only complete clinical school in Victoria. Most of the surgeons and some physicians to out-patients, though they held senior degrees, were engaged in general practice. Of the in-patient honorary staff, one surgeon and two physicians were still general practitioners.

It is my opinion, and I am sure my contemporaries agree with me, that they taught us much of a practical nature. They passed on to us what they had found necessary and useful in their own general practices.

On graduation we did not have the extensive though necessarily superficial knowledge of specialties imposed on the present-day student; but I do believe we were turned out with a good general knowledge of our professional work. The training we had received provided a good foundation on which a practitioner could build whatever specialty practice his tastes and opportunities might later determine.

It is a defect in our present medical education system that general practitioners are not represented, as such, on the body which determines the course of studies for medical students, nor are the services of able and experienced general practitioners used in teaching undergraduates. A good move in this direction has been made recently, and I hope the movement will go further.

It is fortunate that some members of the Faculty of Medicine and some of the clinical teachers in hospitals have formerly been general practitioners, and so have a

broader outlook on what is required in undergraduate medical education than specialists who have never been in general practice. But it is desirable that men who are still general practitioners, knowing what is required in general practice at the present time, should have a voice in planning the curriculum and an active part in teaching the undergraduates, the majority of whom will later be general practitioners.

A defect related to the absence of representation of general practitioner influence is the increasing length of the medical course, and its crowding with detailed and specialist knowledge. It is only natural that professors and specialists who have had so much influence in determining the curriculum should be conscious of the advances in their own subjects, and should feel that such valuable knowledge must be passed on to the student.

Now, I do not dispute the value of these things. All knowledge is valuable to someone at some time. But I do dispute the rightness of including for undergraduates studies that are appropriate to graduates later on, when they have the experience which enables them to appreciate their relative values.

Much that the student painfully and laboriously "crams" for examination purposes is never used by him and is forgotten in his line of practice later. As a student he does not know what is essential and what is not, and he gets a false sense of values from what he is being taught at present.

It is no wonder that many a student finishes his course knowing something about uncommon things, and about many of the latest theories and supposed advances, but not sound in his knowledge of some of the matters which are of everyday occurrence.

The fare of an adult banquet is an unsuitable diet for infants.

Another aspect of this failure to bear in mind what is appropriate to the undergraduate is the fact that, in his final examination, he may be asked by an examiner with specialist knowledge questions more suitable for a candidate for a higher degree or diploma. If he is asked, in his graduating examination, the details and technique of some specialist procedure, is it any wonder that he gets the impression that this is something he should know and is therefore justified in attempting on his own as soon as he is allowed to practise, without going through any post-graduate training?

A noteworthy advance in the last forty years has been the greater accuracy in diagnosis. The improvement has been gradual and continuous, and therefore has not attracted so much notice as some of the astounding innovations in treatment. Yet it is on this greater precision in diagnosis that so much of the improved efficiency of modern medicine and surgery depends.

At the beginning of this period one had to rely on a careful history of the malady and on clinical symptoms and signs, with not very much else to aid one in arriving at the diagnosis. We were given, as students, some remarkable examples by our teachers of what could be found by clinical observation. Such demonstrations left lasting impressions on us. By none of our surgical teachers was this patient, determined attention to accurate and complete clinical examination better exemplified than by George Syme.

It would take too long to enumerate the aids to clinical diagnosis which have become available and extensively used since his time. At the beginning of this period X rays were used to a limited extent, mainly in diagnosis of disorders of the skeletal system. They were not employed much in the examination of the viscera except for hydatid disease and for stones in the urinary tract.

The results of Cannon's experimental work with bismuth in the gastro-intestinal tract of animals began to be employed here in human beings about this time; but its main development came later.

Incidentally, the most advanced urinary calculus X-ray diagnosis at this time was being done by T. Ryan, an eminent general practitioner surgeon at Nhill. Happily he is still with us, and his name will be passed on to future generations of medical students in connexion with the Ryan prizes which he and his brother Edward founded.

The X-ray negatives (on glass plates) of fractures apparently well reduced, as judged by clinical examination, sometimes revealed such startling deformity as to seem incredible by some of the older surgeons; and I well remember one of my honorary surgeons after looking at one such X-ray negative turning to me and saying: "My boy, never look at these things or you will never have a sound night's sleep."

It was while I was a resident medical officer in 1910 that Dr. Konrad Hiller introduced the Wassermann test in Victoria. It is difficult for this generation to realize how wonderful this test seemed when it was first introduced, for at that time the clinical differential diagnosis of some of the forms of tertiary syphilis then quite common presented at times very great difficulty. It was as wonderful then as now would appear a serum test which gave a similarly high proportion of positive results in the differential diagnosis of cancer.

Laboratory and physical aids to diagnosis have increased greatly in number since, and it is difficult to be familiar with the names of all these tests, their methods of application and their significance. These can be of great assistance in diagnosis when properly selected, applied and evaluated. Incidentally, these tests cost time and money. In contributing to the greater efficiency of modern treatment they have contributed to making it more expensive.

However, let it be remembered that often now, as formerly, one may still be able to make a diagnosis on history, signs and symptoms, with the aid of a few comparatively simple microscopic and chemical tests in addition.

At the present time it is interesting to look at the medical record of a patient in a big metropolitan public hospital. Many days may have passed in the accumulation of a thick layer of laboratory reports, some of them repeated, graphs of different sorts, a large pile of X-ray films, and possibly some photographs of the patient's morbid anatomy. The clinical history may be adequate, but sometimes it is not. There may be too little of what the patient has to tell about his ailment and not much about his appearance, mental attitude and environment. The clinical examination has usually been made well, but it is often recorded in signs, alphabetical contractions and hospital jargon which are incomprehensible to the uninitiated.

I do not wish to give an unfair, distorted view and suggest that this is the universal state of affairs; but I do want to assert that it is necessary to guard against drifting into the attitude that diagnosis can be arrived at by getting a sufficient number of tests and reports, sifting them like census cards, and getting, more or less mechanically, the answer that we are dealing with such and such a disease.

This is the wrong approach. Our attitude must continue to be: "Here is a sick man, what causes his loss of health? What disorders of structure and function exist in his body and mind, to be discovered by history and by examinations, clinical and laboratory? And what is the best to be done, not for this or that aspect of his malady, but for the man as a whole, regarded as a complex being with his place in human society and not as a laboratory animal?"

Even with all this careful examination, there may be uncertainty of diagnosis. To wait until diagnosis is certain may be to endanger the patient.

If clinical experience has led you to a diagnosis which is probably but not certainly correct, you may be perplexed to find that it is not supported or confirmed by X-ray examination or some laboratory tests. Remember that logically a negative does not prove something positive.

In such a case you are probably justified in basing action on your positive clinical findings.

Surgically this is important, because delay in action till diagnosis is perfectly certain may be delaying too long. When doubt remains, it may be resolved by direct vision

with the naked eye. Seeing is believing, and a well-planned surgical exposure of the region where disease is suspected may reveal, in time for salutary treatment, a pathological state undiscovered by other means.

A reaffirmation of the justification and value of examination by operative exposure is appropriate here. In the past it had to be used often where it would not now be needed. Now it is not used enough or sufficiently early, because there is too much hesitation and reluctance to rely on a clinical diagnosis if it lacks the support of positive findings from laboratory tests.

On the contrary, no matter how satisfactory the patient's condition may appear to be according to some laboratory test or apparatus, if the clinical examination indicates that he is very ill and unsafe for surgery, trust your clinical examination. This notably applies to urological surgery.

A review of the remarkable advances in surgery in the last forty years would take too long. They have been mainly, but not entirely, associated with operative surgery, and are the result of several causes—chiefly blood transfusion, antibiotics and the newer anæsthetic techniques. These three have brought about a renaissance in surgery comparable to the revolutionary era of Simpson, Pasteur and Lister. Improved illumination, and the assistance of special optical instrument makers, metallurgists, electricians and other technicians of modern industry, have all contributed to this later revolution in surgery.

When we turn to the domain of the physician, the changes are even more astounding, almost dramatic. It would not be an exaggeration to say that medicine in the last generation has undergone a most startling and rapid evolution and has made advances comparable to what happened to surgery after the introduction of Listerism. The old fatalistic, palliative, and almost passive, mental attitude has gone—that acute disease destroyed or was recovered from quickly, and that chronic disease took a long time to bring about a fatal result. It has now been replaced by one of active, hopeful intervention, and one can understand why now, compared with a generation ago, a much higher proportion of bright, energetic young graduates elect to become physicians.

The story is unfortunately not one of universal advance and improvement.

When we do not know or understand basic causes, we are obliged to treat effects, sometimes with good immediate result, but not infrequently with results ultimately unsatisfactory. The frequency with which we successfully treat the dangerous effects of disease may make us complacent, and not mindful of the fact that the disease itself should be prevented.

Take appendicitis for example. We have achieved a considerable success in its treatment in young subjects, but we do not find out what is wrong with our civilization or mode of life that it should occur at all. We can show only a little improvement in late cases and in older patients on what was achieved in Syme's day.

At one time we felt we were fortunate to be able to treat successfully diphtheria diagnosed early. Much in the same way we at present are satisfied to diagnose early and to treat appendicitis and some other infective diseases.

We must keep before us the example of diphtheria. Instead of having to treat the effects of the infection, we are now able nearly to abolish it. A medically enlightened community will be able to abolish other diseases, whilst we have now to be content to treat their effects.

There is now the advantage that the public and our legislators are increasingly conscious of health matters, and it is heartening to see the response when the public is given guidance in terms understandable by the ordinary citizen.

Think what has been done by the infant welfare movement. At first our Association looked at it with mistrust, until the soundness of its principles and the tactful wisdom of its early administration made it obvious that it was destined to be one of the greatest health movements of our time. Young practitioners who have grown up since its establishment cannot realize what it has meant in saving infant life and in diminishing morbidity. Our results are world famous.

We are all aware of what is going on in the attempt to control tuberculosis. The campaign appears likely to achieve success, and it is the duty of all of us to assist in every way to make sure that it is so.

Poliomyelitis is another disease which has excited a great amount of public attention, and as chairman of the Consultative Council I can speak in terms of warm commendation of the support accorded to its activities by successive State Governments, by the Australian Red Cross Society, by government departments, by the medical profession and by the public. Up to the present time we are concerned mainly with the treatment of the effects, but we are hopeful of preventive measures before long.

Much work, with but little improvement in results, has been done on some commonly occurring diseases, the causes of which we still do not know. Our partial successes here again have been in treating effects. Two outstanding examples are duodenal ulcers and malignant growths.

Over the years many theories have been advanced about the causes of duodenal ulcer. At present most emphasis is put on the mental and nervous causes. This is not the whole story. Treatments, medical and surgical, come and go and are revived in slightly different forms, but still there are patients who have recurrent hæmorrhages at short or long intervals, and who do not respond to carefully planned treatments. There is little agreement on any one part of the subject. The nearest agreement is that it is not a disease for the surgeon till some complication arises such as perforation, stenosis or possibly some forms of bleeding.

With malignant disease there is a long story of persistent endeavour and little reward. Improvement in the results of treatment has been slight, with the exception of the treatment of some skin and oral epithelial growths. Elsewhere, apparently hopeful promises have not been fulfilled.

The statistics of carcinoma of the breast show little improvement in the last forty years. Palliation has improved, but cure is no more certain than it was.

One of our difficulties is that we have no exact idea of what we mean by "degree of malignancy". Opinions on the malignant behaviour of a growth, based on its appearances—naked-eye or microscopic—are unreliable. It is not what it looks like, but how it behaves, which tells how malignant a growth is. In other words, you may not be able to know how malignant a growth has been until the patient dies, either from the growth or from some other cause.

This lack of a sure criterion of the degree or severity of malignancy reduces the value of statistics, and makes treatment based on them unreliable. We find to our surprise that some of the longest survivals after surgical removal have been in cases of large growths in various situations which have been in existence for a considerable time. Their malignancy must have been low. On the contrary, some apparently early growths of similar microscopic appearance, removed without delay, have recurred early and widely and destroyed the patient. We say these were very malignant; but how can we tell before the event? It is fatuous to say that we do not know the answer when we cannot clearly state the question.

We are still right in stressing the need for early recognition and treatment of carcinoma; but we are not justified in asserting that early diagnosis ensures a good prospect of cure, or that a history of long duration excludes the chance of cure. The early growth may already have been disseminated microscopically over a wide area. On the contrary, the late growth, even with invaded glands, may not recur after complete removal.

We have all seen, on occasions, untreated cancers grow slowly for years, and, on the other hand, rapidly fatal widely disseminated malignant disease in which it is difficult to say what or where was the primary growth.

Though stress is laid on early diagnosis, students are not taught to suspect malignant disease in its early stages. Museums and text-books tend to give them the conception of carcinoma as a growth with hard secondary glands and other signs which are in practice the signs of a carcinoma which is probably incurable.

Stress should be laid on the incomplete clinical picture of carcinoma in its early stage, and on the recognition of lesions known to be precursors of cancer.

It is better to treat as an early carcinoma, a pathological state whose innocence is in doubt, than to wait until there is clear evidence that it is malignant.

In recent years, blood transfusion, antibiotics, and modern anæsthesia have enabled the surgeon to invade new regions of malignant disease and to carry out more extensive removals. These extensions of life are worth while if the patient spends the remainder of his life in reasonable comfort, but it is not humane to extend by operation the period of a patient's final sufferings. Till we find the real causes and the real cure, these treatments must continue as the best we can offer to patients.

It is hard to see whence enlightenment will come on the nature and cause of malignant disease. It may come, like Pasteur's discoveries, from some non-medical scientist studying a problem apparently unrelated to carcinoma, such as the mutation of bacteria or viruses. We have become accustomed in recent years to remarkable discoveries and new concepts, so we are justified in hoping for light in this gloomy domain of medicine.

Throughout the period there has been a noticeable tendency in all aspects of medical practice to specialization, to separation and dissociation of groups and activities and even to the attitude of treating the patient and his diseases as if he could conveniently be dealt with in unrelated compartments.

We have seen the formation of various colleges and associations of specialists, the separation of the clinical medical schools, the specialities within specialities, the dissociation of treatment of structural change and functional disorder.

It is all part of progress and its benefits are obvious; but the process carries with it disadvantages and defects also.

This is not a local problem; the journals of the English-speaking world make frequent reference to it.

The preservation of the general practitioner in his present important role as the main unit in any medical service, and his elevation to a position of weighty influence in medical educational programmes have been referred to already, and the question naturally arises as to who is to instruct the practitioners of the future in general surgery and in general medicine.

Senior surgeons and senior physicians with a wide general knowledge of their subjects are declining in numbers year by year, and the consultant who can give a broad, balanced, generally valuable opinion concerning a patient's illness soon will not be easy to find.

It will be easy to obtain the services of an appropriate specialist, once it is decided what is the chief disorder afflicting the patient; but who is to decide this point when a patient presents perplexing signs and symptoms in those circumstances in which a consultant general surgeon or general physician is now called in?

I suggest that the proper person to advise on such a problem will be an experienced consultant general practitioner, who will rank with the consultant surgeon, physician or specialist.

The time has arrived for the making of such appointments to our clinical schools. I can think of a number of my general practitioner acquaintances, metropolitan and country, who would add distinction to the staff of any teaching hospital. I know this is "not done" in famous overseas medical schools, but let us get away from the idea that to be progressive we must copy what is being done in another part of the world with social, political and economic conditions different from ours.

By all means let us adopt what is best there, if it is suitable to us; but let us have the sense and originality to think out what is needed here in our own country and do it.

We now turn briefly to some of the altering relations of the medical profession to the teaching hospitals.

Slowly there has been an alteration in the conception of the public hospital. From being a charitable institution, it has been transformed into a public utility. With this there has been a slower change in the financial arrangements with the patients, and with the medical staff.

When I was a resident surgeon to Syme at the Melbourne Hospital, the patients were all unable to afford private treatment and could pay nothing to the hospital. Their support was from charitable contributions, and no one was paid for treating them.

There were nine resident medical officers. We received no salary or honorarium, but made about £30 a year in fees for official certificates, and fees for attendance at court.

The following year was the first year that the hospital made payment to resident medical officers. I think it was about £30 *per annum*.

Now there are about 50 resident medical officers, junior, senior and specialist, and their salaries amount to about £30,000 a year. This is a sidelight on progress and its cost.

Formerly all except nurses, who treated the public hospital patients, were unpaid.

The first group to be paid was the massage staff. It was found that there was not sufficient compensatory inducement for a masseuse to give her services free.

Lately we have seen a start made, in several hospitals, in paying certain members of the non-resident medical staff who formerly gave honorary service. They now devote all or nearly all their time to hospital service.

Unpaid or honorary service in a public utility has become an anachronism, and the conversion of the honorary visiting medical staff to a salaried service is likely to proceed quickly now that a start has been made.

Of course, though this will have obvious advantages, there will be some losses too. The change will be felt in the profession beyond those on the present honorary staff. It will affect particularly the selection of clinical teachers.

Hitherto the teachers have been men on the hospital staff appointed for their ability to treat patients. There is no necessary connexion between teaching efficiency and clinical technical ability — in fact, they may be very unequally developed.

During Syme's lifetime, mainly through the efforts of his friend Dunbar Hooper, who was an eminent obstetrician and gynæcologist unattached to any hospital or clinical school, the chair of obstetrics was established at the University of Melbourne with the professor giving his services to teaching and not to private practice. The extension of a similar plan to surgery and medicine has been lamentably delayed, for a number of reasons.

When full-time salaried teachers and visiting practitioners are appointed to the staffs of hospitals, it will need much thought to arrange that the educational value of hospital clinical experience, at present available to varying grades of what is now the honorary visiting staff, will be extended and expanded to raise the efficiency of a larger number of outside practitioners, who at present have little chance of participating in the valuable educational experience of a great teaching hospital. Also, as I have before indicated, there should be teachers who can teach students the art of the practice of medicine in the world outside the public hospital.

New hospitals are being built around the metropolis, and many more will have to be constructed to catch up with our needs. It is not unreasonable to expect them in time to come to be linked up with other institutions for undergraduate and post-graduate education.

A slow but welcome start has been made in using the excellent facilities and staff of the Queen Victoria Hospital and Prince Henry's Hospital.

Reference has been made already to the increasing tendency of medical science and practice to become divided and subdivided into separate and dissociated parts. This has its good features and its bad features.

Nowhere are the bad features worse in their effects than in the failure to recognize that our patients are human beings having not only bodies but also minds; that in life these are combined and in medical practice must not be dissociated.

Sometimes, of course, it is the physical structure of the body that requires most attention and sometimes it is a disorder of mind which is the main concern; but the older in experience one becomes, the more is one convinced that a patient must be treated not as a disordered machine or as a sick or injured animal, but as a human being temporarily or permanently reduced in physical and mental health.

With all patients, whether they are physically or mentally ill, our primary aims must be to do harm to none, to cure the comparatively few who can be really cured, to relieve many more who are capable of varying degrees of relief, and to bring comfort to all of them. No matter what may be our special interest in medicine, we must always be aware of this combination of body and mind.

For instance, think of the alteration of mental outlook in a young girl with a limb affected by poliomyelitis. While she is little she may seem as gay as other children, but as she reaches adolescence and compares her altered physical state and restricted social activities with those of normal companions she may become so unhappy that the effect on her life and activity through her injured mentality may be much worse than the physical effect of her crippled limbs.

One can also call to mind cases in which long-continued physical disability, out of proportion to the causative trauma, ensues in a patient who, either through inheritance or through a wrong mental environment, has a mentality which prevents a return to full healthy functioning of the body as a whole. The disability persists after all evidence of physical change has disappeared.

We are apt to regard these unsatisfactory recoveries as examples of malingering, or to think we have done something learned when we label the disability as some particular type of neurosis.

My impression is that, owing to the increasing instability of home life and of society since the first World War, with its sequels of financial depression, fears and tensions, there are now more of our population with unstable mental health, with minds ill at ease, than when I commenced practice.

The burden on the community and the loss of national efficiency through the large numbers suffering from functional indigestion, duodenal ulcer or recurrent nervous dermatitis, or developing indefinitely long incapacity for work after physical injury or mental strain, must be very great. Think of the numbers receiving military and invalid pensions and workers' compensation in this category—all paid for eventually by the community.

Are we in the profession, as a whole, exerting a sufficiently strong influence in dealing with this problem of mind and body combined in ill health?

I doubt whether we are advancing the cause by making a speciality of psychosomatic medicine. It is, I believe, furthering the separatist and dissociation movement, whereas every malady is in a varying degree psychosomatic, and every one of us, no matter what he is practising, should be profoundly interested in it and closely associated in its study and solution.

The burden should not be left to the psychiatrists alone. Theirs is the most difficult part; but, if they will give us a lead in educating us and the public, and the government, we must all help them to the utmost of our ability.

We certainly need educating ourselves. It demands thought. Thinking is sometimes troublesome and fatiguing and, unhappily, much that is written about the subject is written in esoteric jargon, which bewilders the ordinary practitioner and makes him lose interest. Clear thoughts must be expressed in clear English.

Without increasing the curriculum, something could be started in improved teaching of students. Their instruction is dissociated. They learn from one set of teachers about various physical disorders, and from another set of teachers they get lectures and demonstrations on severe mental disorders.

Generally, little attention is or can be given by general or specialist clinicians to the psychological features of the physically ill or injured patients, children as well as adults, encountered in the wards and out-patient departments of public hospitals. The difficulties of the mind-body problem increase with the complexity of modern life. More people now work for fewer hours; there is rest for their bodies, but have they achieved calm and restful minds?

We are living in an era in which, for many reasons, there is much uneasiness of mind and much mental ill health ranging from comparatively mild disorder of function to obvious insanity.

The lack of sustained interest in this aspect of public health and welfare is astonishing. We, as medical practitioners, have a better first-hand knowledge of causes and effects than has the general public, and we should be enlightening the public in the attitude they should take to the problems involved.

From time to time over the years there have been rather short-lived outbursts of indignation in the Press about the out-of-date institutions for treatment of patients suffering from severe degrees of mental ill health. The problem is greater and wider than this matter of institutions.

Individual practitioners have striven valiantly to put the modern concepts of mental ill health, its prevention and treatment, before the public generally, the law administrators and the legislature. We, unitedly, in the profession should assist them. It is a tremendous task, needing the talents of many sections of the community; but we should be the leaders of an unceasing agitation to get the campaign started and to keep it going once it is started.

It may seem strange that one who has spent his younger years in teaching some of you the anatomy of the human body, and most of his life as a surgeon physically extirpating parts of it or altering its structural arrangements, should now exhort you to contemplate something intangible in that body. Yet it is that intangible something linked with the physical body which constitutes a patient, a sick or injured human being, not a "case" of such and such a disease or injury.

We all have had painful evidence of the disturbing and even disastrous effects which the incorrect or ill-directed functioning of the mind, this intangible invisible something, can have on an individual, on a group of individuals and even on a whole nation.

It is the last thing I have to speak about in this review of the medical transformation scene since Syme was with us; but I believe it is the one of unchanging and abiding importance. Body and mind are not to be dissociated. Perhaps you agree with me. I hope you do.

THE DIAGNOSIS AND TREATMENT OF EPIDEMIC DIARRHŒA.[1]

By ALISON GARVEN.

From the Department of Pathology, Royal Alexandra Hospital for Children, Sydney.

THE problem of gastro-enteritis in a children's hospital and in the childhood population is still for the most part unsolved. It is true that since the early part of this century we have learnt a great deal about the spread of this disease, and with modern methods of hygiene the major epidemics of summer diarrhœa have now largely

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on June 25, 1953.

disappeared. It is also true that modern therapy has dramatically reduced the mortality rate, so that nowadays it is rare for a child to die of gastro-enteritis. And yet, the humbling fact remains that in spite of all these major advances we are still dealing with a disease the cause of which is completely mysterious in over half the cases.

This fact is a challenge to the bacteriologist to use every method at his disposal for isolating a known pathogen. The following plan of investigation has now become almost universal in laboratories dealing with gastro-enteritis.

Method of Investigation.

It is the practice in a number of hospitals to use rectal swabs, and the protagonists of this method hold that their results are comparable with those obtained by the use of larger specimens. It has been our custom to use a specimen of stool sent to the laboratory on a swab stick in a test tube, and we find that this method gives us enough material for microscopic examination, and for culture, and it is easy for the nurses to deliver the specimens to us. Whichever method is used, it is essential that the specimen be dealt with as soon as possible, and if some delay is unavoidable the swab should first be moistened with broth.

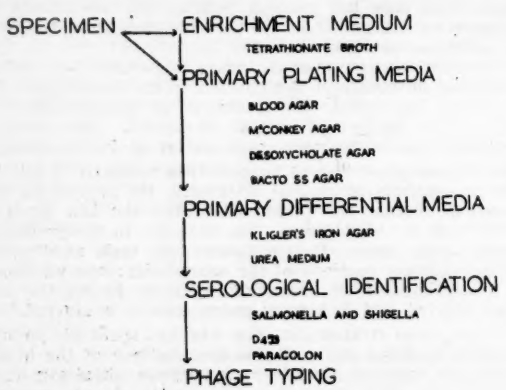

FIGURE I.
Methods of investigation of gastro-enteritis.

The first investigation, and in my opinion perhaps the most important one, is the microscopic examination of the stool for an exudate of leucocytes and red cells. This gives us an immediate indication that we are dealing with an infective process, and that the patient should be segregated at once, irrespective of the subsequent isolation or not of a known pathogen. Even with the best of techniques a pathogen may not be isolated until the third day, or it may be missed altogether until it is isolated in the subsequent ward epidemic.

The specimen is then inoculated onto primary plating media and into an enrichment medium which, after incubation overnight, is subcultured onto the same medium, and follows the same course of investigation (Figure I). The enrichment medium most commonly used is tetrathionate broth, which encourages the growth of the Salmonella group of organisms. No enrichment medium has been found yet for the Shigella organisms, but we have found that Shigella is isolated from primary culture far more readily than Salmonella. In the acute stage of 70 cases of Shigella infection, in only three did organisms fail to appear on primary isolation, whereas in 64 cases of Salmonella infection 50 strains required enrichment.

For primary plating media most workers use a number of different media for the best results. A blood agar plate is needed only for special investigations, when the bacteriologist is interested in the incidence of staphylococci, streptococci, Proteus, *Bacterium coli et cetera*. The largest number of pathogens is isolated when a combination of selective media is used—for example, desoxycholate citrate agar and Bacto S.S. agar—while an occasional highly sensitive strain will be found on McConkey agar when it has been inhibited by the more selective media.

After differentiation into lactose-fermenters and non-lactose fermenters, suspected pathogens can be rapidly and provisionally classified by the use of selective media, of which the one most commonly used is Kligler's double sugar iron agar, with its characteristic colour changes. This can be made more specific by inoculating at the same time a urea medium, the production of urease distinguishing Proteus from Salmonella, both of which produce a similar appearance on Kligler's medium.

The characteristic appearance is then confirmed by the use of specific antisera. These are available for the identification of the Salmonella group, the various members of the Shigella group, certain strains of paracolon, and pathogenic strains of *Bacterium coli*.

Finally, for epidemiological purposes phage typing can be used to identify the organism still further and to trace the origin of similar organisms to a common source. This can now be done in the case of the commonest type of Salmonella, *S. typhi-murium*, and also for *S. typhi* and *Shigella sonnei*.

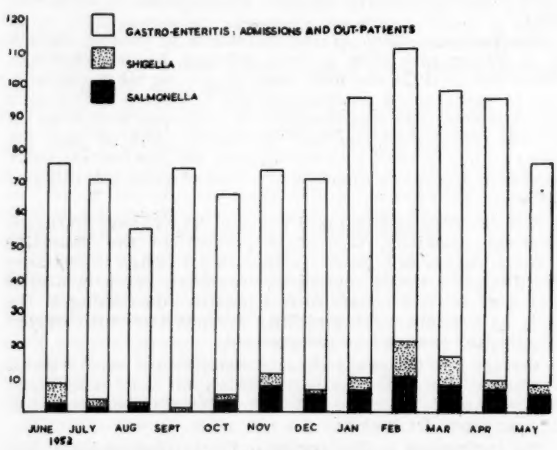

FIGURE II.
Monthly incidence of cases of diarrhœa in in-patients and out-patients over a period of twelve months.

As a result of these efforts we are able to isolate in a small percentage of cases two groups of organisms which are pathogenic beyond any question. These are the Salmonella and the Shigella groups, the former consisting of some hundreds of types, and the latter with its two main types, *S. sonnei* and *S. flexneri*.

Dr. Hamilton will have more to say about the clinical picture of these two main types, but I should like to point out that they differ remarkably in two aspects. The first of these is the age group affected. Apart from hospital cross-infection, Salmonella infections are limited almost exclusively to children aged under two years, whereas Sonne infections are seen principally in the toddlers aged over two years and in the pre-school child.

The second difference is the duration of infection. Salmonella infections are very prone to develop into a carrier state, and organisms have been isolated from the stools twelve months after infection. Sonne infections, on the other hand, tend to be self-limited, and it is rare to isolate the organism for longer than a month after infection. The cause of this difference in behaviour is quite unknown.

Most routine laboratories do not carry the investigation of Salmonella organisms further than a group diagnosis. The identification of Salmonella types is done for us by Miss Nancy Atkinson at the Institute of Medical and Veterinary Science, Adelaide. Table I indicates the

incidence of types of Salmonella organisms isolated from sporadic cases of gastro-enteritis over a period of eighteen months.

Figure II represents the total number of sporadic cases of diarrhœa in out-patients and in hospital patients, excluding cases of cross-infection, over a period of twelve months. These figures serve to illustrate several points. In the first place it is apparent that there is little evidence of a major summer epidemic, although there is a slight increase in the hot summer months. During these summer months the known pathogens maintain their average proportion of 10% to 20% of the total number of cases. The final point I wish to emphasize is this wide expanse of "non-specific gastro-enteritis" in which the intestinal flora do not appear to differ from those found in normal individuals. Part of it, of course, is dietetic in origin, there are included a few cases of the cœliac syndrome, and a smaller number belong to that debatable group, parenteral diarrhœa. But the majority of cases are infective in origin, and have led to much recent investigation. The three main organisms under discussion are strains of *Bact. coli*, paracolon bacilli, and an unidentified virus.

TABLE I.
Incidence of Salmonella Types.

Type.	Number of Cases.
S. typhi-murium	48
S. bovis-morbificans	9
S. Derby	5
S. Chester	3
S. Heidelberg	3
S. Adelaide	3
S. Oranienberg	2
S. meleagridis	2
S. choleræ suis	1
S. St. Paul	1
S. Newport	1
S. kottbus	1
S. anatum	1

Bacterium Coli.

The role of certain strains of *Bact. coli* is now becoming more clearly defined, and in most epidemiological surveys provision is made for the isolation of this organism. Primary growth is obtained on blood agar plates, and a variable number of colonies are picked off for slide agglutination with specific antiserum. If agglutination is present, the diagnosis is confirmed by biochemical tests. With practice one can usually pick out a characteristic colony, which tends to be small, smooth and compact. If these individual colonies show no agglutination, a loop is drawn through the massed growth, and tested for agglutination before the plate is said to be "negative". The specific antiserum is not absolutely specific, as it may give weak agglutination of other strains of *Bact. coli*. This non-specific agglutination is detected by emulsifying suspicious colonies in acriflavine, which agglutinates these heterologous strains, but not the specific strain of *Bact. coli*.

The original pathogenic strain, as described by Bray, and by Giles, Sangster and Taylor, was called D.433. Since that time further strains of ætiological significance have been isolated, and they now number six. The term D.433 has been largely discarded and replaced by Kaufmann's nomenclature, in terms of the O, B and H antigens. D.433 is now called *Bact. coli* O group 111 B.4, and there are five different types of H, or flagellar antigen. This is also called α strain. Another type of *Bact. coli* serologically distinct from this has been isolated and called *Bact. coli* β. In terms of Kaufmann's nomenclature this is *Bact. coli* 055 B.5 H.6.

There is a considerable body of evidence that these organisms can be pathogenic. Adult human volunteers developed enteritis after drinking milk inoculated with *Bact. coli* O group 111, and other workers have produced gastro-enteritis in a baby inoculated with this organism. The suggestion that these organisms are normal inhabitants of the small intestine, and that intestinal hurry causes their appearance in the stools, has no support from the experience of Smith at Aberdeen, who has failed repeatedly to isolate these strains from the stools of babies with bacillary dysentery, and, furthermore, they have not been isolated from the duodenum, jejunum or colon *post mortem*, except from babies with gastro-enteritis associated with one of these organisms.

I think there is little doubt that these strains can be the cause of an epidemic of gastro-enteritis in a children's institution. Ludford and Singer have reecntly traced the origin of one such outbreak to the introduction of *Bact. coli* O group 111 into a nursing home. Some babies were found to excrete the organism for some days before developing symptoms of gastro-enteritis, and it was isolated from all the 11 sufferers. Similar experiences have been reported from many other institutions. It is noteworthy that such epidemics are practically confined to bottle-fed babies.

However, when one considers the ætiology of sporadic cases of gastro-enteritis, the picture becomes more confused. It appears that only about one-third of the cases of so-called "non-specific" gastro-enteritis excrete these organisms. At the Children's Hospital in Glasgow, for instance, out of 158 sporadic cases of non-specific gastro-enteritis these strains were isolated in 53 cases or 33·5%, almost all of them in a profuse growth. These workers also support the findings of Kirby *et alii* (1950) that these strains tend to occur in the severe cases more frequently than in the mild cases.

The incidence of these organisms in control series presents a very confused picture. The early workers stressed their absence in the control series, but these findings have not been borne out by all subsequent workers, and in one series the number of positive cultures in the control series was as high as in the test series. Payne and Cook (1950) found it in 17 infants, of whom 11 had no diarrhœa, although these were all contacts, and a carrier state seems a not unreasonable explanation. Why the organism causes enteritis in one child and leaves another symptom-free is a teasing problem, and suggests a symbiosis of two organisms; but what the other organism may be is unknown.

The position, therefore, appears to be that these two strains of *Bact. coli* can be accepted as pathogenic in some epidemics, and in a minority of cases of sporadic gastro-enteritis.

Paracolon Bacilli.

Paracolon bacilli are isolated on desoxycholate agar, where they appear to be non-lactose fermenting. As a rule they are late lactose fermenters, although some are truly non-lactose fermenters.

As a general rule they are of no ætiological significance, as they are inhabitants of the normal colon. It is a matter of interest, however, that they frequently become the predominant organism after an infection with a pathogenic organism. It is suggested that they serve as an indication of metabolic derangement of the intestinal flora (Bensted, 1939).

However, certain strains are considered to be the causative agent in gastro-enteritis. These strains are the Arizona group, which can be differentiated both biochemically and serologically, and possibly an anaerogenic group Providence. Some Bethesda strains were originally thought to be ætiological agents, but considerable doubt has now been cast on this viewpoint.

Virus Ætiology.

The significance of a virus as an ætiological agent has not received strong support from most workers. Light and Hode extracted an agent from the stools in cases of diarrhœa of the new-born which caused gastro-enteritis in calves, but considerable doubt has been cast on their interpretation of a viral agent, as it was not always destroyed by boiling for five minutes. Buddingh and Dodds

have also isolated a virus from some cases of infantile diarrhœa associated with stomatitis; but this appears to have been an isolated outbreak, and their findings have not been confirmed. Apart from these two instances, all attempts at isolating a virus from the stools of gastro-enteritis patients have been uniformly unsuccessful.

Acknowledgements.

I wish to express my sincere thanks to Miss Nancy Atkinson, of Adelaide, who has kindly cooperated in the isolation of organisms and in the typing of Salmonella strains.

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DIARRHŒA AND VOMITING IN CHILDREN.[1]

By D. G. HAMILTON,
Sydney.

I MAKE no apology for the fact that tonight I will try to be simple, practical and clinical, for although the diagnosis and management of children with acute diarrhœa are not always simple, they are mainly clinical. The biochemist can be of assistance in assessing initial electrolyte imbalance and in controlling its correction. However, in the absence of such help the routine set out here, if applied with careful and repeated clinical observation, will almost invariably succeed.

Gastro-enteritis may vary from a mild illness with a few loose stools for a few days to a fulminating and terrifying one that may make a child very gravely ill in twelve hours and dead in less than twenty-four. The commonly recognized organisms are the Salmonella and Shigella groups. Salmonella diarrhœa tends to occur in infants under two years of age and to develop gradually over several days, with diarrhœa, vomiting, refusal of food and little fever. The infant may become seriously ill, with the gradual development of dehydration, apathy and abdominal distension. Shigella diarrhœa is more often an acute illness in older children, with a dramatic onset of high fever, profuse watery diarrhœa, rapid dehydration and toxicity with delirium and confusion. Often abdominal pain and fever precede the diarrhœa. Mental change is sometimes so prominent that lumbar puncture is necessary to exclude meningitis. This difference is not constant, for fulminating Salmonella and Shigella infections are seen often enough. The so-called non-specific diarrhœa, that may be due to unrecognized organisms or to improper feeding, may vary as much as does that due to infection. Diarrhœa attributed to parenteral infection is usually not severe.

In treatment there are two essential parts. The first is to provide and adequate and acceptable diet. The second is to make good the fluid and electrolyte loss that is the main cause of death.

Diet.

For the artificially fed infant, a diet progressing through the following stages is usually satisfactory.

STAGE I.—Glucose (four tablespoons) and salt (half a teaspoon) to the pint of water. The commercial preparation "Glucodin" is satisfactory, its vitamin *D* and calcium content being of no consequence here. Small, frequent drinks are given.

STAGE II.—Whey with added glucose, providing electrolytes, carbohydrate, a little soluble protein, and fluid.

STAGE III.—Skimmed "Bengerized" milk, in half the usual strength for the infant's age. Skimming removes the poorly tolerated fat. "Bengerization" makes the casein more digestible and adds some carbohydrate. This feeding provides carbohydrate, protein and fluid, but only half the usual electrolyte intake of the infant because of the dilution.

STAGE V.—Skimmed "Bengerized" milk, in full strength for age.

STAGE V.—"Bengerized" unskimmed milk, in full strength for age.

STAGE VI.—Normal milk mixture.

The time occupied in each stage varies from child to child, advance being made as improvement occurs. One may commonly spend one day on Stages I and II, two days on Stage III, four days on Stage IV, and a week on Stage V. If the diluted mixture of Stage III is given for long, extra electrolytes, particularly those of sodium and potassium, should be given. It is wise to continue with Stage V for a week after the diarrhœa ceases.

For the breast-fed infant, in whom gastro-enteritis is very rare, the following routine can be followed:

STAGE I.—Glucose-saline solution.

STAGE II.—Equal parts of glucose-saline solution and expressed breast milk.

STAGE III.—Breast milk.

Usually each stage need occupy only a day or two in the feeding of these babies.

For the older child it is better to omit milk altogether and use a diet as follows:

STAGE I.—Glucose-saline solution flavoured with strained orange juice, or barley water with some added salt (orange and barley are useful sources of potassium).

STAGE II.—Simple solids in addition to these drinks, such as jelly, meringue, apple snow, thin crisp toast with "Vegemite" or apply jelly, water arrowroot. This will suffice for several days and when obvious improvement has occurred small amounts of mashed potato without butter, steamed fish, brains and chicken can be added and so the child graded back to a normal diet.

Replacement of Fluid, Electrolytes et Cetera.

It is the proper replacement of fluids and electrolytes that plays the biggest part in saving life in this disease. If a child is dehydrated, and perhaps suffering from shock through rapid fluid loss and intoxication, this lost fluid must be replaced. In the first three hours of treatment one attempts to replace the estimated amount of fluid lost. At the same time electrolytes must be replaced, for the body will not retain fluid without electrolytes, and large loss of sodium, chloride and potassium has occurred in vomitus and stool.

After this initial stage of correction of dehydration, fluids, electrolytes and calories will need to be given by intravenous infusion until they can be taken by mouth. If it is necessary to continue intravenous feeding for more than two days, some protein should be added in the form of serum. Serum is also of value as part of the initial transfusion given to a child suffering from severe shock.

The following substances are required for this intravenous infusion. The stated amounts are approximate, and designed to give as simple an approach as possible. Precise normal requirements for various ages are not known. Estimates of the loss in stool and vomitus and of the degree of dehydration are approximate. I have endeavoured therefore to give figures that will serve as a satisfactory working guide. Variations in amount may be made according to the progress of the patient observed at frequently repeated clinical examinations.

Water.

The normal daily requirements in infancy are 2·5 ounces (75 millilitres) per pound of body weight. By four years this has fallen to 1·5 ounces and by ten years to one ounce. To it the following must be added: (*a*) the estimated daily abnormal loss of fluid in stools and vomitus; (*b*) in the first three hours an amount sufficient to correct estimated

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on June 25, 1953.

dehydration. This is estimated by weight loss, thirst, oliguria, dry tongue, dry and inelastic skin, sunken eyes and fontanelle, apathy and restlessness.

Sodium.

The normal daily intake of sodium is small while the infant is entirely milk fed, and may be roughly assessed at one milliequivalent of sodium per kilogram, or one-thirtieth of a gramme of sodium chloride per pound of body weight. When mixed feedings are being taken, this normal daily intake is approximately trebled. So the child from one year onwards normally eats perhaps three milliequivalents of sodium per kilogram or one-tenth of a gramme of sodium chloride per pound of body weight in a day.

In the child dehydrated from vomiting and diarrhœa there has been considerable sodium loss. So on the first day of treatment one gives up to four times the normal daily allowance to infants under six months and up to twice the normal daily allowance to children over one year, with an approximate gradation between these ages. Of this first day's allowance, three-fourths is given in the first three hours with the initial rapid infusion of fluid. This rapid replacement of sodium ensures retention of the fluid given.

Potassium.

Potassium is never urgently required on the first day of an acute illness. It must never be given by intravenous infusion till dehydration is corrected and urine is being passed. It can then often be given by mouth as whey, orange or potassium citrate. For intravenous use it can be added to the infused fluid from ampoules containing 10 milliequivalents of potassium or 0·755 gramme of potassium chloride in 10 millilitres.

Abdominal distension and hypotonia are early signs of potassium deficiency. They are likely to be seen in the child whose illness has already lasted some days, and who has been having dilute feedings with no added potassium for all this time. If this deficiency is not corrected, shock with peripheral vascular failure, cardiac irregularity, tachycardia, diarrhœa, vomiting, collapse and death are likely to follow.

The amount of potassium required is about three milliequivalents per kilogram of body weight. This is contained in approximately 0·25 gramme of potassium chloride.

Protein.

The infant normally requires three to four grammes and the older child two grammes of protein per kilogram of body weight per day. If it is necessary to withhold oral feedings for more than two days, it is wise to give at least half these amounts as serum in the infused fluid.

Calories.

Calories are provided largely as glucose in the intravenous feeding.

The fluids commonly available for intravenous use are the following: (i) "normal saline" (0·9 gramme of sodium chloride in 100 millilitres); (ii) "one-fifth normal saline and 5% glucose" (0·2 gramme of sodium chloride in 100 millilitres); (iii) glucose (5%) in distilled water; (iv) serum (seven grammes of protein and 0·6 gramme of sodium chloride in 100 millilitres); (v) ampoules containing 10 milliequivalents of potassium or 0·75 gramme of potassium chloride in 10 millilitres.

Management.

Let us then consider the management of a child, aged one year and weighing 20 pounds, who is acutely ill and dehydrated.

First Day: The Stage of Replacement.

The normal daily requirement of fluid is 1500 millilitres; allow 300 millilitres for excess daily loss and 500 millilitres for estimated dehydration. This gives a total of 2100 millilitres in the first twenty-four hours. Of this, the allowance for dehydration and one-eighth of the remainder will be given in the first three hours.

The normal intake of salt would be one-tenth of a gramme per pound of body weight; but for this dehydrated child twice this is given—that is, four grammes in the first twenty-four hours. Of this amount, three-fourths is given in the first three hours. Thus, in the first three hours the child receives about 700 millilitres of fluid (allowance for dehydration and one-eighth normal daily requirement) containing three grammes of sodium chloride (that is, 200 millilitres of "normal saline" containing two grammes of salt and 500 millilitres of "one-fifth normal saline" with glucose containing one gramme of salt). Then in the next twenty-four hours one would expect the infant to receive 1400 millilitres of fluid and one gramme of salt. This will consist of 500 millilitres of "one-fifth normal saline" with glucose containing one gramme of salt, followed by 900 millilitres of glucose in distilled water.

It must be emphasized that these amounts may need to be varied. The child's state of dehydration is assessed every few hours. The appearance of œdema or crepitations at the lung bases calls for a reduction in the amount of both fluid and salt given.

Second Day.

On the second day the child receives its normal daily requirement of fluid, sodium and potassium, with an allowance for excess loss in stools and vomitus if necessary. There should now be no need for any allowance for dehydration, and the child might receive 1600 millilitres of fluid (1500 millilitres for normal daily requirement *plus* 100 millilitres for loss in stools), containing two grammes of salt and two and a quarter grammes of potassium chloride. The fluid given would therefore be one litre of "one-fifth normal saline" with glucose, 600 millilitres of glucose in distilled water and 30 millilitres (three ampoules) of the potassium chloride solution.

On this and subsequent days fluid, sodium and potassium given by mouth are subtracted from the intravenous infusion, and again the amounts are checked by frequent examinations of the child, and by reference to a carefully kept record of fluid intake, vomiting, bowel actions and micturition.

Drugs.

Drugs play a comparatively small part in the management of this disease. The bowel sulphonamides are effective against the Shigella organisms, but not against the Salmonella group. Chloramphenicol has some effect against both groups, but its value is not very great. In the care of seriously ill children, in whose treatment one would like to use these drugs, vomiting all too often makes it impossible. In the treatment of the mildly affected child they are unnecessary.

Bismuth and kaolin preparations have some small value. In the treatment of the very sick child they should not be used; often they are vomited. They are of most use when there is persistent mild diarrhœa, and then the addition of a small amount of opium enhances their value.

Sedatives are sometimes necessary. The very restless, dehydrated child usually loses its restlessness when its dehydration is corrected. Chloral hydrate can be used when vomiting has ceased, and I see no objection to small doses of morphine. I have had this disease and been immensely unhappy with pains all over, a mighty turbulence in my abdomen and frequent calls to stool. In despair I swallowed a quarter of a grain of morphine. Within half an hour my pains were gone, my bowel was quiet and I drifted off to sleep. I do not know whether Coleridge had had gastro-enteritis, but he certainly knew the merciful relief of sleep when he had his ancient mariner say:

> O sleep! it is a gentle thing,
> Beloved from pole to pole!
> To Mary Queen the praise be given!
> She sent the gentle sleep from Heaven,
> That slid into my soul.

Summary.

The successful treatment of gastro-enteritis depends on the proper replacement of fluids and electrolytes, at first by intravenous administration if necessary and then by mouth, followed by the use of a carefully graded diet. Details of this treatment are discussed. All other considerations are of minor importance.

THE SUBARACHNOID SPACE: SOME EXPERIMENTAL APPROACHES TO ITS PATHOLOGY.[1]

By W. J. SIMMONDS,
Kanematsu Memorial Institute of Pathology, Sydney Hospital.

THE title chosen for this paper is a general one, but what I have to say tonight will be related mainly to one topic—the removal from the subarachnoid space of foreign material such as plasma protein or red blood cells. In most other regions of the body plasma protein, at least, could scarcely be considered as foreign material, since protein molecules continually leak from the capillaries into the extracellular space and are returned to the circulation, mainly by way of the lymphatics. In the course of a day about half the circulating plasma protein is returned in the lymph (Crandall, Barker and Graham, 1943; Courtice, Simmonds and Steinbeck, 1951). When hæmorrhage or exudation of protein-rich fluid occurs in regions such as the pleural or peritoneal cavities where this extravascular circulation is rapid, the unclotted material is readily removed by acceleration of the normal process of lymphatic absorption (Courtice and Simmonds, 1949; Courtice and Steinbeck, 1951; Courtice and Morris, 1953). In the subarachnoid space the extravascular circulation of protein is normally very small. Dr. F. C. Courtice and I thought that it would be interesting to see what happened to plasma protein or blood, experimentally introduced. Some of our results and those of other workers may be of clinical interest. Such results, and their possible clinical relevance, form my theme tonight.

Before we discuss how the subarachnoid space is "cleaned up", let us consider the degree of contamination which may occur in abnormal circumstances. How much protein may exude into the subarachnoid space in meningitis and how much blood may leak from an aneurysm on a cerebral artery? The upper histogram in Figure I shows the frequency-distribution of protein concentrations in lumbar cerebro-spinal fluid at the time of diagnostic puncture in 157 cases of purulent meningitis studied by Merritt and Fremont-Smith (1937). The lower histogram summarizes the results culled from Sydney Hospital records of a series of 32 patients with meningococcal and pneumococcal meningitis. In the large series, in two-thirds of the cerebro-spinal fluid samples protein concentrations were between 100 and 500 milligrammes per 100 millilitres. In the Sydney Hospital series the average concentration was 460 milligrammes per 100 millilitres. The value usually accepted for the volume of cerebro-spinal fluid in man is between 90 and 150 millilitres. If the protein concentration in the cerebro-spinal fluid was uniform, there would be about 500 milligrammes of protein, equivalent to seven millilitres of plasma, in the subarachnoid space in patients with meningitis, on the average, compared with about 20 milligrammes in the normal subject. However, in 11 cases of meningitis studied by Merritt and Fremont-Smith (1937), the mean lumbar cerebro-spinal fluid protein concentration was 4·5 times the mean ventricular value, and in four out of five cases the cisternal concentration was 2·5 times the ventricular. Thus 500 milligrammes of protein would probably be an over-estimate of the amount present at the first lumbar puncture. It would, however, be a very modest estimate of the amount exuded and removed in the course of the disease. With regard to contamination of the cerebro-spinal fluid with blood, the distribution of red blood cells is even less uniform than that of protein, and the estimation of the volume of blood lost from a ruptured cerebral aneurysm is notoriously difficult. I am informed by those with considerable clinical experience that 10 millilitres of free blood, excluding the clot, would probably be a reasonable estimate.

[1] Read at a meeting of the Section of Pathology of the New South Wales Branch of the British Medical Association on March 3, 1953.

Rate of Removal of Red Blood Cells and Plasma Protein.

It is not possible, then, to estimate accurately the amounts of plasma protein or blood with which the cerebro-spinal fluid is contaminated, but these are not inconsiderable. Clinical estimates of the rate of removal are also open to a number of objections. However, it has been found that blood or plasma injected into the *cisterna magna* in animals disappears rapidly. We demonstrated this, so far as plasma protein is concerned, in rabbits (Courtice and Simmonds, 1951), after injection into the *cisterna magna* of 0·5 millilitre per kilogram of the animal's own fresh heparinized plasma. The dose of protein was equivalent, in man, to a uniform cerebro-spinal fluid concentration of over one gramme of protein per 100 millilitres. The plasma protein molecules were labelled before injection with the blue dye, T1824. Figure II shows the results of the experiments. The lower curve shows that the protein concentration in the cerebro-spinal fluid fell rapidly in the first five hours, then more slowly. Twenty-four hours after injection it was about 100 milligrammes per 100 millilitres. Some of the decrease in concentration was undoubtedly due to dilution of the injected plasma by almost protein-free cerebro-spinal fluid. The top curve shows, however, that labelled protein molecules were being absorbed rapidly, since about 20% of the injected protein was in the blood-stream five hours after injection. The concentration fell away after that, because dye-protein was passing from the blood-stream into the tissues more rapidly than it was being absorbed from the subarachnoid space. The middle curves show

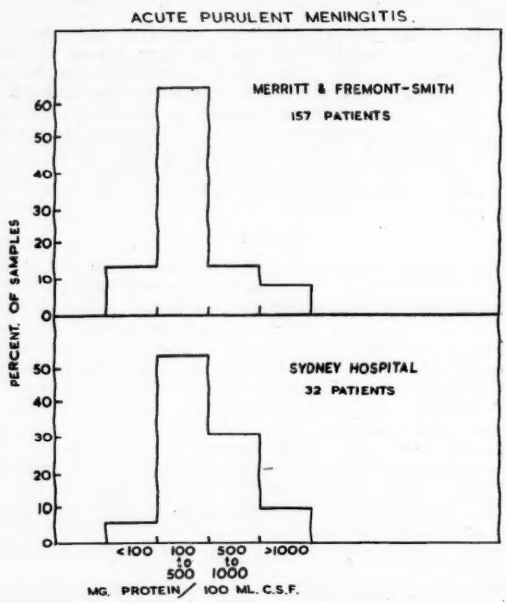

FIGURE I.

Frequency distribution of protein concentration in lumbar cerebro-spinal fluid at time of diagnostic puncture in patients with acute purulent meningitis (Merritt and Fremont-Smith, 1937), upper histogram, and in Sydney Hospital patients with meningococcal and pneumococcal meningitis, lower histogram.

that dye and protein disappeared from the cerebro-spinal fluid at the same rate, as one would expect if the dye was a firmly bound non-irritant label. Dye-labelling was a useful method of following absorption in the first five to eight hours. After that, we had to rely on the estimation of protein in the cerebro-spinal fluid and the amount of dye-staining to be seen at autopsy. The low protein content in the cerebro-spinal fluid twenty-four hours after injection,

TABLE I.

Recovery of Red Blood Cells in Cervical Lymph after Replacement-Injection of Own Heparinized Blood, 0·5 Millilitre per Kilogram, into Cisterna Magna in Cats Anæsthetized with "Nembutal". Experiments of Five Hours' Duration.

Number of Cats.	Posture.	Red Blood Cells in Lymph.	
		Maximum Count per Cubic Millimetre.	Percentage of Injected Cells Collected.
5	Horizontal, supine ..	0 to 9000	Negligible
4	Head down (22°) ..	30,000 to 300,000	0·5 to 3·0
1	Head down (22°) ..	1500	Negligible

and the very faint staining of the cerebral cerebro-spinal fluid seen at autopsy, showed that practically all the injected plasma had disappeared. The lumbar cerebro-spinal fluid was usually a faint but definite blue. This suggested that protein was somewhat more slowly absorbed from the spinal subarachnoid—which might explain the pronounced differences between lumbar and cisternal cerebro-spinal fluid protein in meningitis. So far we have not encountered reports of other experiments of this type in the literature. Russell (1932) reported that protein concentrations in the cerebro-spinal fluid fell at about the same rate as red blood cell concentrations after subarachnoid bleeding in patients with head injury.

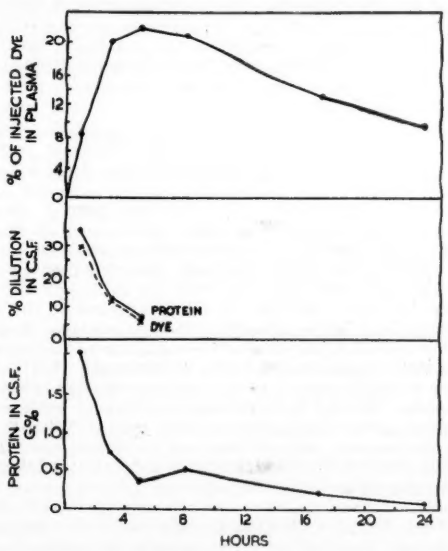

FIGURE II.

Absorption of dye-labelled protein from the subarachnoid space in rabbits, after cisternal replacement injection. The uppermost curve shows the average percentage of labelled protein in the circulating plasma, the middle curves the average concentrations of dye and protein in the cerebro-spinal fluid, expressed as a percentage of the concentration in injected plasma, and the lowest curve the average concentration of protein in cerebro-spinal fluid as grammes per 100 millilitres of cerebro-spinal fluid, at various times after injection.

The rate of disappearance of red blood cells from the cerebro-spinal fluid seems to have received more attention from experimentalists. Figure III shows the average results in dogs (Sprong, 1934; Meredith, 1941), in rabbits (Simmonds, 1952) and in a few patients with blood in the cerebro-spinal fluid (Merritt and Fremont Smith, 1937; Russell, 1932). It can be seen that, in all three species, most of the free red cells have disappeared within forty-eight hours. However, there are considerable differences in the shapes of the disappearance curves. In the case of dog and rabbit this may be due to the method used. In the dog, Sprong, and later Meredith, measured the disappearance rate by draining all the available cerebro-spinal fluid through the lumbar sac at various times after injection of freshly drawn arterial blood. They considered that the very rapid disappearance of cells in the first few hours was due to their fixation, by agglutination or by being caught up among the arachnoid filaments or by phagocytes. In the rabbit, I injected the animal's own heparinized blood

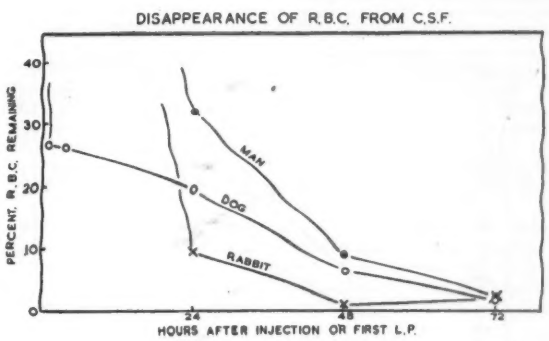

FIGURE III.

The rate of disappearance of erythrocytes from the cerebro-spinal fluid. The cells remaining in man are expressed as a percentage of the red blood cell count at the time of diagnostic puncture. For details and sources of data see text.

into the *cisterna magna* and took cisternal samples at various times afterwards, estimating the rate of disappearance from the drop in concentration of red blood cells. In Figure III these concentrations have been expressed as percentages of the five hour value. However, the drop in concentration during the first five hours was consistent with a steady dilution of the injected blood. There was no evidence of a very rapid initial withdrawal of cells from the cerebro-spinal fluid. For example, over 60% of the injected blood was withdrawn in cisternal samples at half an hour and 40% at three hours after injection, without any attempt at drainage. It seems likely that a lot of red cells settled out or became entangled in the arachnoid meshwork while the cerebro-spinal fluid was being drained off through the lumbar sac in dogs. This is not just an academic point, because if Sprong's and Meredith's view is correct the clearance of red cells from the cerebro-spinal fluid takes place mainly "on the spot". The cells stick to the arachnoid and are later removed by phagocytosis or hæmolysis. If this is true, the mechanism must be remarkably efficient. I injected blood three times weekly for three to five weeks in a group of rabbits. They remained quite unperturbed, the red cells disappeared from the cerebro-spinal fluid in the usual way after each successive injection, and at the post-mortem examination there was little blood to be seen in the subarachnoid space (Simmonds, 1952). Thus six to 10 millilitres of blood had disappeared from the subarachnoid space leaving virtually no trace. By labelling the red cells before injection it was possible to demonstrate quite clearly that a fairly large proportion of the red cells which disappeared were not trapped locally but passed out through the meninges (Simmonds, 1953). Figure IV shows that rabbits' own red blood cells, labelled

with radioactive phosphate, passed into the circulation at the rate of about 1% per hour in the first sixteen hours after cisternal injection. Unfortunately, the P_{32} label is not permanent, and estimates of absorption rates at sixteen hours and later are uncertain. So far I have not used erythrocytes labelled with radioactive iron. This requires a donor animal. Some preliminary experiments with P_{32} suggest that red blood cells from another rabbit are treated differently from the animal's own red cells, in the later stages of absorption. In experimental animals, then, the subarachnoid space is almost free from plasma protein within twenty-four hours of contamination, while most of the red cells are removed within about forty-eight hours. Both protein molecules and red cells can pass, intact, through the meninges and into the circulation. The diameter of a red cell is about 2000 times the equatorial diameter of a protein molecule, but this great difference in size does not result in a corresponding difference in rate of absorption. Thus, in rabbits, 6% of labelled cells passed into the circulation in five hours, compared with 20% of labelled protein molecules.

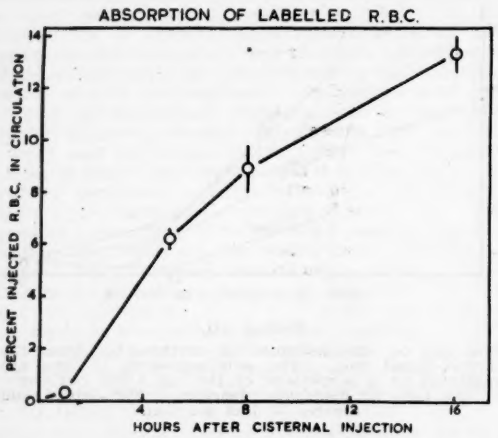

FIGURE IV.

The rate of absorption into the circulation in rabbits of their own red cells labelled with radioactive phosphate and injected into the *cisterna magna*. (Mean values ± standard error of mean.)

Mechanisms of Removal from Cerebro-spinal Fluid.

Absorption of Intact Protein Molecules and Red Cells.

In discussing how the labelled cells and protein get into the blood-stream, the lymphatic pathways will be considered first. Reference has already been made to the efficiency of lymphatic removal of protein and red blood cells from the peritoneal and pleural cavities. However, the anatomical arrangements are very different from those in the subarachnoid space. The serous cavities have a rich lymphatic drainage directly under the serosa, and areas where colloids and particles may readily pass through the serous lining, while the lymph is propelled rapidly onwards by the respiratory movements. The meninges, on the other hand, have no intrinsic lymphatics (Weed, 1914). Nevertheless, there are certain regions where lymphatics outside the meninges are quite close to the subarachnoid space, and it has been known for a long time that material injected into the space can pass out through the meninges in these regions. The anatomical features of these "leaky spots" and their lymphatic connexions have been frequently reviewed (Weed, 1914; Le Gros Clark, 1929; Faber, 1937; Brierley and Field, 1948). At the head end, the most important route is by way of the arachnoid sheaths of the olfactory nerves, into the nasal submucosa and so into lymphatics which drain into the cervical duct. Brierley and Field (1948) have shown that particles passed out from the spinal subarachnoid chiefly in the region of the posterior nerve root ganglia and so into lymphatics in the epidural fat pads. Most of these lymphatics drain into the thoracic duct (Field and Brierley, 1948*a*).

Such anatomical studies define the lymphatic routes for absorption, but do not indicate how much of a natural contaminant, such as plasma protein or blood, may be removed in this way. To investigate this point in regard to plasma protein, we (Courtice and Simmonds, 1951) injected plasma into the *cisterna magna* or into the lumbar theca in cats, after labelling the protein with T1824, and measured the amount of labelled protein in cervical duct and thoracic duct lymph. The following is a description of a typical experiment. The experiment was designed to show the absorption of dye-protein from the cerebro-spinal fluid into the lymphatics and directly into the blood-stream.

Dye-plasma, one ml per kilogram of body weight, was injected into the *cisterna magna* of a cat under "Nembutal" anæsthesia, after the removal of one ml of cerebro-spinal fluid per kilogram of body weight. The duration of the experiment was four and a half hours. The amount of dye injected was 12 milligrammes; the amount of dye in the cervical duct lymph was 0·58 milligramme (5% of that injected), the amount in the thoracic duct lymph was 0·05 milligramme (0·4% of that injected), and the amount in the plasma was 1·79 milligrammes (15% of that injected).

It can be seen that lymphatic absorption from the head end was quite appreciable—5% of the injected dye-protein in four and a half hours. From the tail end it was negligible. Lymphatic absorption nevertheless accounted only for the minority of the protein molecules which passed into the blood-stream. All the main lymphatics were cannulated or tied, and yet 15% of the injected dye-protein reached the blood-stream—three times as much as passed into the lymph. So there must be some more direct pathway. Probably this is by way of the arachnoid villi, since this is the main route for fluid and dissolved substances. For technical reasons we have been unable to prove this conclusively, so far.

When blood was injected into the *cisterna magna* in rabbits, the lymphatic pathways from the head end were readily demonstrated. In sections of the olfactory region red cells were seen to be crowded into the sheaths around the olfactory filaments and certainly passed into the lymphatics, since they often filled the sinuses of the deep cervical lymph nodes. Dr. Alan Palmer demonstrated the same appearances in post-mortem material from cases of subarachnoid hæmorrhage. Despite the striking histological findings, the percentage of red cells recovered in the lymph was much less impressive than the percentage of plasma protein molecules, and this did not appear to be due to the cells being trapped in the nodes (Simmonds, 1952). Table I shows that the posture of the animals affected the results, presumably because the erythrocytes formed sediments in dependent parts of the subarachnoid space. With the cats lying horizontally, only a few red cells appeared in the lymph in the first five hours. With the animals lying head downwards, up to 3% of the injected cells appeared in the lymph. However, in rabbits an average of 6% of labelled cells were absorbed into the circulation in five hours, and so it seemed that red cells, like protein molecules, could be absorbed directly into the circulation, by-passing the lymphatics. This was demonstrated by experiments with labelled cells (Simmonds, 1953), summarized in Figure V. It can be seen that the rate of absorption of red cells was not affected by ligation of the cervical lymphatics. Thus animal experiments have shown that lymphatic absorption accounts only for a part of the plasma protein or erythrocyte removal. It seems fairly clear that the greater part of the material passes directly into the circulation. Absorption is much more rapid from the cerebral subarachnoid than from the spinal compartment.

Other Mechanisms.

Do lymphatic and vascular absorption account for all the protein molecules and red blood cells which disappear from the cerebro-spinal fluid? In the case of labelled protein, the absorption is sufficiently rapid to suggest that they do. In the case of red cells it is difficult to be certain. It seems to

be generally believed that removal by phagocytosis or hæmolysis is the main mechanism. I think there are a number of arguments to be advanced against this view. The rapid disappearance of red cells in the first twenty-four hours is difficult to reconcile with the experimental evidence in cats (Essick, 1920) and dogs (Jackson, 1949) that very little hæmolysis or phagocytosis takes place in the first twenty-four hours. Dr. Palmer and I obtained similar results in a small series of rabbits, and Hammes (1944) noted the same delay in a series of 53 autopsies at various intervals after spontaneous subarachnoid hæmorrhage. Hæmolysis, indeed, seems to be a biologically undesirable method of removing red cells. Jackson (1949) has shown that the products of red cell breakdown are much more irritant than intact red cells, and Finlayson and Penfield (1941) have advanced clinical and experimental evidence that severe aseptic meningitis may be produced by these breakdown products. Alpers and Forster (1945) described an early clumping (in twelve to twenty-four hours) of erythrocytes in histological sections of the subarachnoid space in cases of bleeding from ruptured

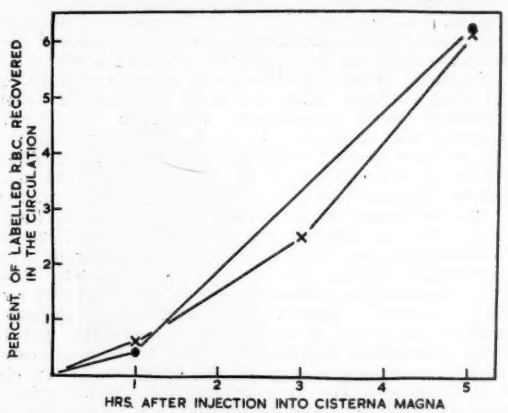

FIGURE V.

The absorption of labelled cells from the subarachnoid space in rabbits with cervical lymph ducts ligated (lines and dots) or intact (lines and crosses).

cerebral aneurysm, head injury or intracerebral hæmorrhage. The immobilized cells were then isolated by a slow process of organization and concurrently removed by phagocytosis. It is difficult to assess from histological sections how much of the blood originally present was removed in this way. Wherever there is tissue damage and enmeshing of cells in clot, removal will depend on cellular mechanisms; but the present account is concerned with cells in the bloody cerebro-spinal fluid where no clotting takes place, apparently owing to absence of fibrinogen (Madonick and Newman, 1942-1943). There are possible pathways for the escape of intact protein molecules or erythrocytes which have not been considered in this paper, for example, Dubois-Ferrière (1939) found "Thorotrast" in the intraadventitial spaces of the cortical vessels after injection into the subarachnoid space. He considered that it passed along these so-called lymphatic spaces out of the cranium and eventually reached the cervical lymph nodes. Carbon particles (Field and Brierley, 1949) and, in our experiments, dye-protein or blood passed out through the sheaths of the optic nerves into the retroorbital tissues. "Thorotrast" passed in small amounts through the epithelium into the olfactory nasal cavity, as well as into the lymphatics of the nasal mucosa (Faber, 1937). There is no quantitative evidence concerning the importance of these pathways. It has been asserted (Hassin, 1930) that drainage into the perineural spaces is an important pathway for the escape of cerebro-spinal fluid. However, our experiments with dyed protein gave no support for this idea, and a number of investigators have been unable to demonstrate anatomical continuity of subarachnoid space with perineural space (Somberg, 1947; Brierley, 1950). So far, then, animal experiments have not enabled us to account with complete satisfaction for the removal of blood from the subarachnoid space. The demonstration that a considerable proportion of the red cells are absorbed intact in animals suggests that, if a suitable occasion arose, an attempt to confirm the mechanism in man would be warranted.

Finally, one might ask whether these pathways for the exit of protein molecules and particles from the subarachnoid space ever serve as "back doors" for the entry of infection into the space. Le Gros Clark, in 1929, dropped a mixture of potassium ferrocyanide and iron ammonium citrate into the nose in rabbits and showed that it reached the olfactory bulbs in less than one hour, by way of the olfactory sheaths. He suggested that microorganisms might float up into the subarachnoid space on a sluggish stream of fluid around the olfactory nerves. Recently, Field and Brierley (1948*b*) put forward the idea that poliomyelitis virus might pass through the meninges from lymphatics in the spinal extradural tissues, especially if the lymph was dammed back in any way. The main argument against such ideas is that no one seems to have demonstrated clearly that anything larger than the readily diffusible ferrocyanide radicle can take a short-cut through the meninges. Biggart (1940) states that carmine particles placed on the olfactory epithelium were subsequently recovered from the subarachnoid space; but Yoffey and Drinker (1938) showed that the colloidal dye T1824 did not pass from the nasal mucosa into the cerebro-spinal fluid. Dr. Courtice and I could detect no dye-protein in the cerebro-spinal fluid after injecting it into the spinal extradural tissues in cats. It seems that, although protein molecules and particles can pass from cerebro-spinal fluid through the meninges fairly readily in certain places, they do not pass easily into the cerebro-spinal fluid by the same pathways.

Summary.

Plasma protein or red blood cells may exude into the subarachnoid space in considerable amounts in pathological conditions such as acute purulent meningitis and subarachnoid hæmorrhage. The rate and mechanisms of removal of these contaminants have been studied quantitatively in animals. The results of such experiments and their possible clinical relevance are considered briefly in this paper.

When fresh homologous plasma was injected into the *cisterna magna* in rabbits, most of the protein disappeared within twenty-four hours. When blood was injected, few red cells remained after two to three days. There is some evidence that the rate of removal in man is similar to that in experimental animals.

When the plasma protein molecules were labelled with the blue dye, T1824, and the red blood cells with radioactive phosphate, it was found that intact protein molecules and erythrocytes were absorbed from the cerebro-spinal fluid and appeared in the blood-stream. Cannulation of lymphatics revealed that some of the material passed out of the cerebral subarachnoid space, mainly in the olfactory region, into the cervical lymph ducts. The majority of the absorbed protein molecules and erythrocytes followed a more direct route, probably the arachnoid villi, appearing in the blood-stream when all the main lymphatics were ligated. Absorption from the lower spinal subarachnoid space was negligible.

It is suggested that most of the protein may be removed from subarachnoid exudates by absorption of the intact molecules, and that absorption of intact cells may be responsible for removal of a considerable proportion of the erythrocytes in cases of subarachnoid hæmorrhage.

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THE INCIDENCE OF CONGENITAL MALFORMATIONS FOLLOWING MATERNAL RUBELLA AT VARIOUS STAGES OF PREGNANCY.

By I. S. COLLINS,

New South Wales Red Cross Blood Transfusion Service, Sydney.

IT is well known that rubella may produce congenital malformations, stillbirth or miscarriage. The ætiological relationship between this disease and congenital defects was discovered by Gregg (1941) and has been confirmed by numerous authors. More recently, attempts have been made to prevent infection in vulnerable pregnant women exposed to rubella. Temporary passive immunization is provided by the use of convalescent serum or its derivatives. In New South Wales, convalescent serum is supplied by the Red Cross Blood Transfusion Service. In Victoria, γ globulin prepared from convalescent serum is used (McLorinan, 1950). The practice in both States is to supply the immunizing agent to susceptible women in the first four months of pregnancy, but not if the exposure to rubella has occurred later in pregnancy. Recently there has been a prolonged epidemic of rubella in New South Wales, and the New South Wales Division of the Australian Red Cross Society has supplied many hundreds of doses of rubella convalescent serum to pregnant women in contact with rubella patients. It is known that in the great majority of instances these women showed no evidence of rubella at the end of the incubation period. However, in some instances rubella did occur in spite of the passive immunization. In the absence of a control series of exposed women not given the convalescent serum it is impossible to draw any conclusions concerning the value of convalescent serum in preventing rubella, nor did the controlled experiment recently reported by Anderson and McLorinan (1953) yield enough evidence to permit the authors to give a definite opinion on the value of γ globulin in preventing rubella. Clinical impressions, however, do suggest that convalescent serum and γ globulin are helpful in prophylaxis. In view of the shortage of convalescent serum, it is advisable to restrict its use to the stages of pregnancy at which infection with rubella is most likely to cause damage to the fœtus. In the present study, the literature has been briefly reviewed in an attempt to ascertain the stage of pregnancy at which the incidence of congenital malformations produced by rubella is highest.

The earliest relevant investigations were those carried out by Swan and his colleagues (1943). The information used by these workers was obtained in response to a circular letter sent to all medical practitioners in South Australia. Particulars were sought with regard to children whose mothers had suffered from acute exanthemata during pregnancy. The results confirmed the observations of Gregg (1941) regarding the high incidence of congenital defects following maternal rubella in the first few months of pregnancy. Only one child was unaffected out of 18 whose mothers had contracted rubella in the first month of pregnancy.

The next survey was made by Gregg and other workers on behalf of the Director-General of Public Health of New South Wales (Gregg *et alii*, 1945). The information was obtained from two sources. At the beginning of the survey, notification of cases of congenital defects following maternal rubella was sought by means of a notice sent to doctors in New South Wales. Later, medical practitioners and hospitals were circularized and asked to notify all pregnant women who contracted an exanthematous illness. The results showed that all the cases of malformation from maternal rubella followed rubella in the first four months of pregnancy, and that apparently children were not affected when the maternal infection occurred after the fourth month. In 130 cases abnormality of children followed maternal rubella in the first four months of pregnancy.

In three cases the child was normal, although rubella had occurred in the first four months. In one of these

rubella had occurred during the first month of pregnancy. The authors realized that information regarding "negative" cases was incomplete and suggested further studies with particular reference to such cases.

Another survey was conducted by Patrick in 1947 (Patrick, 1948). Particulars were obtained, by means of a *questionnaire*, of 7822 children born in Queensland in 1941. Information was received concerning at least one-third of the children born in the State in that year. In 262 cases the mothers were certain that they had contracted rubella during the pregnancy. Of the children concerned, 129 were available for examination. This investigation showed a considerably higher proportion of cases in which children were normal after maternal rubella in early pregnancy than did the previous investigations. Seven out of ten children whose mothers had rubella in the first month of pregnancy were normal. The high incidence of negative cases is probably due to the fact that the survey was carried out on living children approximately six years old. Many severely malformed children would have died before reaching that age.

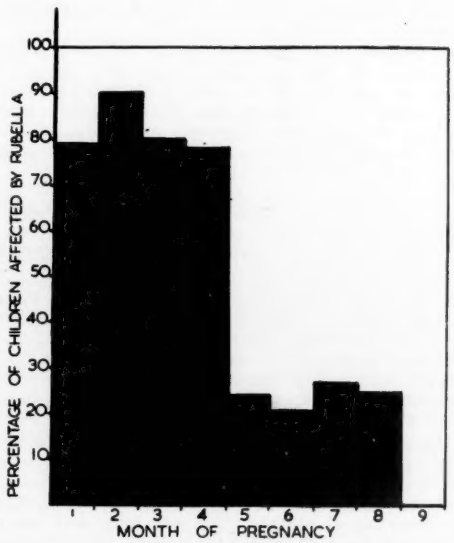

FIGURE I.

Results obtained from these three surveys are shown in Table I and Figure I. The percentages of small figures in the table may be open to criticism, but they give an indication of the position. In at least 89% of cases the affection of the children followed maternal rubella in the first four months of pregnancy, and in only 5% of the cases of malformation was it known that the disease had occurred after the fourth month. The number of cases in which children were normal after maternal rubella in the first four months is appreciable, even if rubella had occurred at the first month. The normal children are, however, greatly outnumbered by the abnormal children, the proportion being about one to four. The reverse is true of maternal rubella occurring after the fourth month.

Evidence of a similar nature has been obtained from various authors in the United States (Abel and van Dellen, 1949; Aycock and Ingalls, 1946; Fox and Bortin, 1946; Ober, Horton and Feemster, 1947; Prendergast, 1946). Their results agree fairly closely with the Australian figures. In addition, some of the American workers provide information regarding the risk of abortion or stillbirth following rubella.

It is interesting to notice that most of the pregnant women affected by rubella were in the earlier months of pregnancy. It is not known why so few women in late pregnancy were affected by the disease. The suggestion has been made (Swan, 1949) that women in late pregnancy stay at home most of the time, and hence are not exposed to the disease. Rubella, however, is often spread domestically, from children of neighbours to children of a given household and then to their mother. This makes the suggested explanation appear unconvincing.

It would be desirable, in assessing the ætiological significance of rubella in the later months of pregnancy, to compare the incidence of deformities in such cases with the incidence of deformities when there was no maternal history of rubella. Unfortunately, reliable statistics are not available for comparison. A precise study would need to be made with reference to individual congenital defects. The deformities produced by rubella comprise deaf-mutism, congenital cataract, microphthalmos, microcephaly, mental deficiency and patent *ductus arteriosus*. Other types of deformity are not commonly produced by rubella. In cases in which other types of deformity do occur, rubella in pregnancy may be coincidental. Moreover, lesions of the type produced by rubella may also be due to other causes. Congenital deafness is sometimes genetically determined, the gene for deafness being recessive (Nelson, 1950). Probably about 30% of cases of congenital deafness are of this hereditary type (Whetnall, 1952). Microcephaly may be genetic, may follow irradiation of the pelvis during pregnancy, or may be due to parental infection with toxoplasmosis (Warkany, 1947), a condition which may also cause hydrocephalus and microphthalmos. The above examples indicate that there is a definite incidence of congenital defects when rubella is known not to be the cause.

TABLE I.

Incidence of Malformation following Maternal Rubella at Different Months of Pregnancy (Australian Figures).

Month of Pregnancy.	Affected Children.	Normal Children.	Percentage Children Affected.	Total.
First ..	33	9	79	42
Second ..	99	11	90	110
Third ..	79	19	80	98
Fourth ..	34	13	78	47
Fifth ..	5	16	24	21
Sixth ..	4	15	21	19
Seventh	3	8	27	11
Eighth ..	2	6	25	8
Ninth ..	0	3	—	3
Uncertain	15	9	—	24
Total ..	274	109	—	383

Subclinical attacks of rubella have been suggested by Gregg *et alii* (1945) as a cause of congenital defects when there is no maternal history of the disease. In experimental studies it has been shown (Krugman *et alii*, 1953) that rubella can occur without the rash, the clinical features being mild pyrexia and enlargement of posterior occipital glands. An illness of this type would very often pass unnoticed, and may be of considerable importance in causing so-called sporadic cases of congenital malformation during epidemics. In between epidemics, however, subclinical rubella could not be regarded as the usual cause of congenital malformations in cases in which a history of the disease was lacking.

Conclusions and Summary.

The risk of malformation following maternal rubella at the various stages of pregnancy has been discussed. The risk is very great after infection in the first four months, the proportion of affected children being 70% to 80%. After the fourth month the incidence of malformations is very much less. Information is limited because of the small numbers of cases of rubella occurring late in pregnancy, and because other causes of congenital malformation exist. It would appear that there is some risk of malformation following maternal rubella after the fourth month, but that it is not very great.

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Reports of Cases.

RECURRENT TRAUMATIC DIAPHRAGMATIC HERNIA: REPAIR WITH TANTALUM.

By R. M. DUNN,

Sydney.

THE following case is reported because of the comparative rarity of the condition in Sydney. It is, I think, one of the few occasions on which a large diaphragmatic defect has been repaired with tantalum mesh. The hernia was complicated by a volvulus of the thoracic stomach. It is idle to speculate on the mechanism of the hernia, as the patient also sustained a head injury and has no recollection of the sequence of events—possibly it was a flexion injury (there is radiological suggestion of some crushing of the second lumbar vertebra) in rigid inspiration with a sudden severe increase in intraabdominal pressure, with consequent splitting and avulsion of the diaphragm from part of its costal attachment. There was no suggestion that a congenital or inflammatory weakness preexisted.

A twenty-two year old Australian soldier was involved in a jeep accident on May 17, 1952. He was admitted to Wagga Base Hospital in a state of shock and sweating; the left side of his abdomen was rigid. He underwent immediate abdominal laparotomy with the following findings: (*a*) a large (10 inches) tear of the left cupola of the diaphragm with some avulsion from the anterior costal margin; (*b*) herniation of the stomach, colon and small intestine into the thoracic cavity; (*c*) collapse of the left lung and mediastinal shift to the right. The hernia was reduced and repaired with chromicized gut. The operation seemed to be complicated by left hæmothorax and obstinate lung collapse, but by the end of July, 1952, he seemed reasonably well.

He was admitted to the Repatriation General Hospital, Concord, on August 7, 1952, complaining of intermittent fullness in the chest and breathlessness on exertion, with some cough and sputum. Examination at this time revealed good chest expansion with absence of breath sounds at the base of the left lung. Some intestinal gurgling was audible over the chest. The apex beat was normally placed. Recurrence of the hernia was confirmed radiologically on August 11 and August 21, 1952, by X-ray examination after a barium meal and enema.

On September 1, 1952, a history of severe upper abdominal pain present for the past six hours was given. Some attempts at vomiting were made, with the production of small amounts of clear mucus, but no bile. Moderate respiratory distress, some cyanosis and gross mediastinal shift to the right were present. An X-ray examination on that date was reported on as follows:

> The mediastinum is displaced to the right. The left lung is compressed upwards in the thoracic cage by a large collection of air which contains a fluid level in its lower part and also contains the splenic flexure of the colon. The diagnosis lies between a spontaneous pneumothorax with a pleural effusion or extreme distension of the stomach which contains a fluid level. The latter would appear to be the diagnosis as the stomach wall can be seen in the thoracic cavity.

Attempted passage of a stomach tube brought no relief. It seemed certain that we had observed and investigated this patient for too long, and that he had a volvulus of a thoracic stomach. Immediate operation was undertaken.

A thoraco-abdominal approach with removal of the seventh rib was used. A large recurrent diaphragmatic hernia was found, involving the anterior half of the left side of the diaphragm and extending to within one inch of the œsophageal hiatus. The left lung was completely deflated, and the left half of the thorax was occupied by a hugely dilated and twisted stomach. The twist was on the œsophago-duodenal axis and occurred through 180°. No circulatory embarrassment of the stomach was present, and there was no blood in the stomach. Transverse colon and small bowel completed the contents of the hernia. The spleen was adherent to the margin of the defect. There was, of course, no sac. All the involved viscera were adherent to the lung, pleura and pericardium. The stomach was aspirated and contained large quantities of air and clear fluid; adhesions were separated and the spleen was removed. The left phrenic nerve was crushed. The edges of the defect were mobilized, and it was apparent that a defect some six inches by four inches in area existed. This was closed with tantalum mesh and wire sutures. The wound was closed in layers with an underwater chest drain.

The operation was complicated by some left lung collapse, and it was a further two weeks before full expansion had occurred. The patient was then sent on convalescence, and appeared in his eighth post-operative week with an attack of homologous serum jaundice.

He is now well. The wounds are sound, and on fluoroscopic examination it is apparent that the diaphragm moves in paradoxical fashion.

Comment.

Harrington (1948) commenting on a series of 58 cases of traumatic diaphragmatic hernia, states that symptoms are severe and tend to progress rapidly. I found this to

be only too true in the case described above. Once the diagnosis is established, early operation is indicated. In this case acute symptoms were no doubt produced by aerophagy, which caused increasing stomach displacement into the thorax and twisting until a ball-valve effect was produced—air entered the stomach, but was unable to be eructated or passed on. Increase in intragastric pressure also increased production of gastric secretions.

It was not possible to pass a tube into the stomach. Harrington recommends the use of *fascia lata* stabilized with linen thread through an abdominal incision in such cases. In cases in which the defect is too great to be bridged in this manner and in which there is avulsion from the costal margin, he recommends reduction of the diameter of the left side of the chest by resection of portion of the eighth, ninth and tenth ribs.

I have not been able to trace records of any other cases in which tantalum has been used for repair. It seems a satisfactory material for covering large defects, and probably could be used more often even in such a mobile muscle as the diaphragm. Congenital defects could also be corrected in this way, if necessary. The use of tantalum seems much the simpler method, and firm attachment to the costal margin is readily obtained. Tantalum is readily available and time-saving in the treatment of patients who are very ill.

Summary.

1. A case of recurrent diaphragmatic hernia with volvulus of a thoracic stomach is described.

2. Early surgical treatment in all cases of traumatic diaphragmatic hernia is urged.

3. The advantages of tantalum mesh repair in large defects are pointed out.

Acknowledgements.

I wish to thank the chairman of the Repatriation Commission for permission to publish this case report.

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PRECOCIOUSNESS: CASE REPORT.

By R. BOWMAN and EDWARD WILSON,
Sydney.

Clinical Record.

M.P. first attended the Saint George Hospital in January, 1951, because of precocious development of her breasts. Her date of birth was August 5, 1944. She was in first grade at school, but she concentrated poorly and her mental age was well below her six years. Apart from an umbilical herniorrhaphy, she had had no previous illness and had not menstruated.

On examination, the patient was seen to be uniformly big for her age, and she had a vacant expression and a habit of continually sucking her thumb. Her breast development was most obvious and some slight growth of pubic hair was present (Figures I and II). Her weight was four stone and her height four feet four inches. There was no growth of axillary hair or unusual distribution of fat about the body, and no hypertrophy of the external genitalia. On rectal examination no enlargement of the internal genitalia could be detected. Of the second dentition only the first incisors and the first molars were present.

X-ray examination revealed no abnormality in the skull, the pituitary fossa, the abdomen or the chest; but the epiphyseal development in the limbs was that of a normal child aged twelve to fourteen years (Figures III and IV). No abnormality was found in the excretion pyelogram or on microscopic and chemical examination of the urine. Her blood counts and the result of glucose tolerance tests were within normal limits. The basal metabolic rate was +2%, and the twenty-four hour excretion of 17-ketosteroids in the urine was 1·9 milligrammes.

With the passage of some months the breast development increased still further. In order to exclude an ovarian or suprarenal neoplasm exploratory operations were carried out.

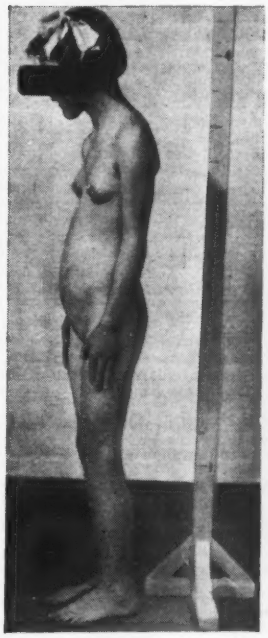

FIGURE I.

FIGURE II.

On September 4, 1951, through a lower mid-line incision the internal genitalia were examined. The uterus, uterine tubes and ovaries all appeared normal; microscopic examination of biopsy specimens from both ovaries revealed no abnormality.

On October 30, 1951, both suprarenal glands were exposed through the beds of the twelfth ribs. The left suprarenal gland appeared normal; the right was nearly twice as large. Half of the right gland and a small portion of the left were removed. Both appeared normal on microscopic examination including fuchsinophile staining.

Convalescence after both operations was rapid and uneventful. Since the second operation she has been much less restless and more amenable to discipline. When she was examined in June, 1952, considerable pubic hair was present, but to date there has been no further sexual development, although she has grown another two inches in height—a growth which unfortunately has not been matched by any similar mental progression.

Discussion.

Early development of the breasts in young girls without a tumour of the suprarenal glands or ovaries is relatively common and is rarely of sinister significance (Dods, 1952). Jolly (1950) has stated that girls suffering from precocious development should be subjected to laparotomy only if a mass is palpable; but in this case pronounced epiphyseal maturation had also occurred and necessitated further investigation.

In this case the only certain method of excluding a suprarenal or ovarian neoplasm appeared to be by exploration. Perirenal air studies cannot be relied on to detect

slight enlargement of the suprarenal glands, and the taking of them did not appear to be justified in this case. Apart from slight trauma, both mental and physical, she is none the worse for these operations, and we are now able to watch her development and growth without any great fear

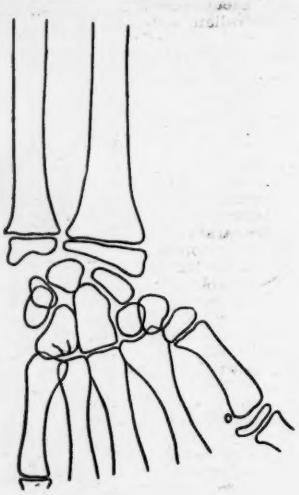

FIGURE III.

Drawing of the X-ray photograph of the right wrist showing the outlines of the bones and the epiphyses.

of metastases. It is still possible that she has a minute tumour of the hypothalmic region or of the pituitary gland; but exploration of these areas is not warranted at

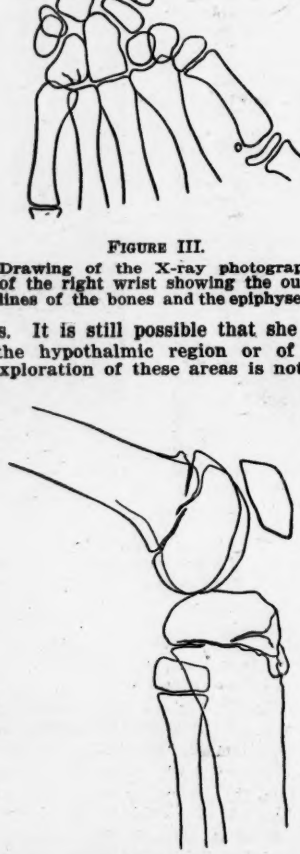

FIGURE IV.

Drawing of the X-ray photograph of the right knee joint showing the outlines of the bones and the epiphyses.

present. In view of the mental retardation it is more likely that she has a congenital defect of the hypothalamic region.

No further investigation or treatment is indicated, and apart from her mental condition the prognosis should be good.

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Reviews.

Australia in the War of 1939-1945, Series 5 (Medical), Volume II, "Middle East and Far East", by Allan S. Walker, M.D., Ch.M., F.R.A.C.P.; 1953. Canberra: Australian War Memorial; Sydney: Angus and Robertson, Limited; 1953. 9¼" x 6¼", pp. 701, with many illustrations. Price: 35s. (Obtainable at all booksellers.)

THE medical series of "Australia in the War of 1939-1945" will, as most people know, include four volumes. The first of these volumes, entitled "Clinical Problems of the War", was reviewed in this journal on December 13, 1952. The second volume, "Middle East and Far East", will be welcomed by a large circle of readers. The first volume revealed Dr. A. S. Walker as an historian worthy of the great work with which he has been charged. The second volume will enhance his reputation. Something of his attitude of mind can be gathered from a quotation of words by Louis Pasteur, which appear on the page immediately behind the title page, as follows: "I would say that two contrary laws seem to be wrestling with each other nowadays: the one a law of blood and death, ever imagining new means of destruction and forcing nations to be constantly ready for the battlefield—the other, a law of peace, work, and health, ever evolving new means of delivering man from the scourges which beset him. Which of these two laws will ultimately prevail, God alone knows." This volume shows how the army medical services of Australia, compelled to witness the effects of the law of blood and death, tried to deliver men from the scourges which beset them.

The construction of the volume is well shown in the first two paragraphs of the preface. Part 1 of the volume follows the formation of the 6th, 7th, 8th, and 9th Divisions of the A.I.F., and of the First Australian Corps in the Middle East, their training and preparation, medical organization in Australia and overseas, and the campaigns in the Middle East. Certain variants from the chronological order have had to be made. Towards the close of 1941 the story has to follow the working out of a "threefold destiny": that of the first Australian Corps in its unfulfilled assignment in the Far East and its eventual return to Australia, that of the 9th Division, left to play Australia's part in the critical battle of El Alamein in 1942, and that of the 8th Division, committed to a bitter campaign in Malaya. Part 2 opens with the move of the Corps headquarters with the 6th and 7th Divisions and the events which caused them to return to Australia. It then deals with the fate of the defence forces sent to Timor, Ambon, and New Britain, and of the 8th Division in Malaya. Australia's island war in New Guinea and the Solomons, and the concluding phases in Borneo will be considered in the third volume.

The first chapter on the inter-war period, 1919-1939, is of considerable importance, as was the opening chapter in Gavin Long's first volume dealing with the army, and entitled "To Benghazi". Dr. Walker sets out in detail the steps that were made for the reorganization and coordination of the medical services of Navy, Army, and Air Force. He shows that the parties concerned in moves and counter-moves were the medical arms of the three fighting services, the Commonwealth Department of Health, and the general body of the medical profession, whose opinions were voiced by the Federal Council of the British Medical Association in Australia. It is satisfactory to the general body of the medical profession to realize that their Federal Council did much useful work at this time, and that it took an active part in that very important body known as the Central Medical Coordination Committee. As Dr. Walker reviews the inter-war period he makes it clear that certain objectives in the organization and coordination were reached, but that others were not. In spite of repeated efforts, amalgamation of the medical arms of the three services was never achieved, not even at a high level. At the same time he points out that coordination of men and matefial for the purposes of the medical services, including the civilian, was achieved at last, and he adds that it hardly needs a prophet to foresee its advantages under the threat of war, and still more during war. Prolonged delays in the consummation of this orderly and economical organization were largely the result of differences of opinion as to who should wield the power; however, the spur of danger provided the necessary stimulus. He points out also that the introduction of these methods showed how the value of men and women with technical training was paramount in war, provided they were correctly placed. A further point must be noted. During the period under discussion another variety of medical coordination was also seen to be important, namely, the achieving of a stronger technical linkage between the medical services of Australia and those of other members of the British Commonwealth of Nations.

When war was declared, the Director-General of Medical Services, Major-General Rupert Downes, was engaged in a tour of military establishments overseas. This journey had long been advocated by the Federal Council of the British Medical Association. Dr. Walker remarks that it was a pity that the delays in obtaining approval and finance for this tour considerably reduced its value. As it was, General Downes was hurriedly recalled and had not returned to Australia when war was declared. Meanwhile, Colonel W. W. S. Johnston was acting in his stead, with Major E. L. Cooper as his assistant. At the outbreak of war the staff of the Army Medical Directorate included three permanent officers, the D.G.M.S. and two non-medical staff officers, Major Christie and Lieutenant L. P. Barnet, a civilian clerk, and several militia officers who were available for part-time duty, nominally up to sixteen days *per annum*. The task facing Major General Downes was colossal. How well this task was carried out need not be detailed here. While he was in London he had the foresight to secure the services for an Australian expeditionary force of Sir Thomas Dunhill and Dr. N. Hamilton Fairley (both Australians) as consulting surgeon and consulting physician respectively. The organization of medical headquarters was undertaken, and we are informed that some delay occurred in the obtaining of approval for additional staff. Among those appointed was Captain Lady W. MacKenzie. Her appointment to the headquarters staff is described as significant, as she was the first woman doctor to be commissioned. This innovation was followed by the commissioning of more women in the medical services. Later numbers of women were appointed in special departments of medical units and for routine duties in base hospitals. On the question of medical organization, special reference should perhaps be made to medical equipment, and in particular to the important role played by the Medical Equipment Control Committee. In regard to the medical supply position at the end of 1940, which he describes as acute, Dr. Walker observes that the cooperation of the British Medical Association was most helpful, especially in its periodical issuing of circulars to its members of information and warnings about the use of scarce materials.

One chapter deals with Bardia and Tobruk. December, 1940, brought to the 6th Division the dramatic change from training to action. The Division, under the command of Major-General I. G. Mackay, was chosen for the coming drive against Bardia. The regimental medical officers, described as perhaps the most vital individual links in the medical services of the army, were well trained for their jobs. They were described by the A.D.M.S. of the Division as "a good lot", and it is pointed out that individuality had some freedom of expression in the details of medical arrangements for the aid post of each combatant unit. Dr. Walker mentions the military plan very shortly, but, as is fitting, devotes a good deal of space to the medical plan. Unfortunately, the story cannot be told here in detail. Dr. Walker deals with the advance to Benghazi and then with the retreat from Cyrenaica. Then follows an excellent chapter on the siege of Tobruk; it is one of the most interesting in the whole book, and it is shown, in general, that the standard of health in Tobruk remained high. Hospital admissions, including wounded, remained below 2% of the forces per week, except when unusually large numbers of casualties caused a sudden temporary peak in the rate. Medical conditions in the Western Desert and at Tobruk are described in a separate chapter.

In dealing with the campaign in Greece, Dr. Walker is perhaps at his best. His story of the withdrawal is an epic. The final paragraph of the chapter on Greece may be quoted:

> Members of the medical services in Greece shared with others the frustrations of the campaign. Preparations carefully made for weeks beforehand suddenly became valueless, threats such as that of malaria ceased to be significant; but against these there was privilege of helping a disciplined force of men who were confident even though exhausted. The medical officer of an infantry battalion remarked during the brief retirement that he had "never seen such a large number of people honestly trying to do something for someone else".

In the chapter devoted to Crete the difficulties of the campaign are clearly set out and some "incredible and tragic events" are described as having occurred in the hospital area. The 6th New Zealand Field Ambulance was captured and released the next day, but its commanding officer was shot by a German parachutist, though he had surrendered. The Germans would not recognize as non-combatants any persons wearing steel helmets, and regarded them as not being protected by the Red Cross, though this view is not based on the Geneva Convention. The evacuation of wounded from the island was extremely difficult. Among the last 4000 men embarked were as many medical personnel as possible, excepting those who were needed to care for the men too ill or helpless to be moved. As an additional medical officer was required for the remaining men, Captain Gunther was chosen to remain. The final list of those who should remain was drawn up on the assumption that still another night of evacuation would be available. This opportunity did not come, and Lieutenant-Colonel LeSouef and other members of the Australian ambulances remained and were taken prisoner.

The campaign in Syria, though lasting only five weeks, was "packed with medical problems, both administrative and professional, chiefly related to the practical application of technical knowledge". Dr. Walker observes that at the end of the campaign there lay before the Australian forces a period of occupation and an immediate future of conjecture, but full of thought and work for the medical services. The chapter on El Alamein shows how the 9th Division was transferred from Syria and faced its assignment in the Western Desert to determine the future of North Africa. The section on medical preparations for the El Alamein campaign is full of interest. It is pointed out that the health of the 9th Division was not in all points satisfactory; endemic disease caused considerable wastage. The most prevalent disease was diarrhœa; much of this was thought to be dysentery, though exact bacteriological diagnosis was not always practicable. Sigmoidoscopy was a very useful procedure in the differentiation of dysentery from other bowel disturbances. Infective hepatitis caused relatively more wastage because of the longer convalescence which it demanded. Fortunately the Australians were in a good area on the coast, where the climate was not oppressive and the dust was less troublesome than further inland. The chapter closes with an interesting medical review of the campaign and a review of the surgical work. In the beginning of 1943 the 9th Division embarked for return to Australia.

The first part of the book concludes with a chapter entitled "In Australia, 1941-1942". Here are set out details, many of which will be remembered as an account of them is read. The story of the Japanese air raid on Darwin shows how heavy the censorship was at the time of this happening. The chapter ends with reference to the 8th Division of the A.I.F., and some components of the 7th Division, which, "after a brave, fruitless struggle" disappeared into the oblivion of captivity. Dr. Walker in reference to the Medical Corps of this Division states that their "opportunity for service was even greater under the cloud of defeat than in the flush of victory". In Part II he shows how they grasped that opportunity.

In the second part of the book, after a description of the return of the First Australian Corps to Australia there comes an account of the campaigns in Timor, Ambon and New Britain. Dr. Walker explains that these accounts show how operations in a tropical zone often entail work in a difficult terrain and a trying climate beset with endemic disease, against which a medical service strives with difficulty, but not without results.

In the chapter on the Malayan campaign it is stated that with the fall of Singapore about 15,000 Australians became prisoners of war. The troops were depressed by having to yield to a force which they counted as less than their equals. Though the civil and military conditions prevailing at Malaya are not *per se* the concern of a medical history, the present generalizations are made. We read that it seems fair to comment that there was a wide degree of unawareness, at least among civilians in Malaya, and that those aware of the dangers did not succeed in remedying weakness and defects before the avalanche began. Everything was tragically late in the campaign, and from the very start inevitability seemed to pervade the general cast of thought. "It cannot be denied, moreover, that coordination and harmony were not always outstanding features of a situation which demanded the highest degree of unity." If there was any lowering of general morale discernible in the forces, it was not due to medical causes. Relations of the medical services with the command were not always unstrained, but difficulties were those of temperaments. When the end came, though none among the British forces on the island could foretell what the future might bring, the members of the medical services had their own absorbing work to do. The story of captivity in Changi and of work on the Burma-Thailand railway has been told in this journal by several of those who were concerned in it. The whole story may perhaps best be summed up by the following quotation, which concludes the chapter on the Burma-Thailand railway.

> In this story of three and a half years of endurance we have been, of course, more intimately concerned with the Australian forces, and chiefly with the efforts made by the medical services to protect them from illness and death. That these efforts were not more successful was not due to lack of quality in the work carried out by the

medical services of the A.I.F. and other national forces, who worked together in one cause. If the story has in it elements of repetition it is because of the constantly recurring menaces of sub-nutrition, oppressive hardship and infectious disease. Against these trials of the flesh and the greater trials of the spirit the forces on the whole kept their heads high. There were times when courage flagged, especially with the sick. Now and then the patients and others needed encouragement to eat unpalatable food, and there were those who in extremity like Hezekiah turned their face to the wall and would have died; sometimes the will to live flickered and failed, but in the main the greatest asset of the medical services was the spirit of the men themselves, and in particular of their leaders. There were a few who would stoop to meanness and degradation, but the dark places of the heart revealed in the hours of extreme trial are small compared with the light that shines. It is appropriate here to pay special tribute to the orderlies, both trained and untrained in medical work, and the willing volunteers who in performing the most menial, trying and dangerous tasks for those whose health and lives were in the balance sometimes gave their own lives.

In recommending this volume of the history to Australian readers we would state that Dr. Walker has put us forever in his debt. He has told his story in an orderly sequence and, as far as can be judged, with justice and discrimination. Occasionally we need to be reminded of what our fellow man is capable, of the heights to which he can rise, and of his capacity to serve his fellow man. If we read what is set out in this volume, not purely as a tale of achievement, but with some discernment of the spirit that lay behind what was done, we shall be able to face with confidence the future of this country.

Modern Trends in Forensic Medicine. Edited by Keith Simpson, M.D. (Path.), London; 1953. London: Butterworth and Company (Publishers), Limited. Sydney: Butterworth and Company (Australia), Limited. 10" x 7", pp. 336, with 133 illustrations and two plates in colour. Price: 82s. 6d.

As the editor of the book, Keith Simpson has had the assistance of a team of distinguished workers, each a specialist in his own field. The writers set out in this work to review the outstanding advances and significant research made in the last ten years in forensic medicine.

The first two chapters in the book are devoted to stillbirth and neonatal death, and they include a well-illustrated discussion on the pathology of the lung in these states. One of the most difficult tasks the forensic pathologist may have to face is the determination of legal live birth. The increasing awareness among pathologists of the pitfalls in this undertaking is well emphasized. The traditional hydrostatic test of respiration as an indication of legal live birth is unreliable and the teaching that in stillbirth the lungs are not expanded is fallacious.

There is an interesting chapter on the investigation of sudden death. Death in 70% to 75% of all medico-legal autopsies is due to natural causes, so it is essential that the forensic pathologist should have a wide knowledge of morbid anatomy. There is a useful exposition of the obscure or difficult autopsy. We do not find that coronary thrombosis is as common as the text indicates. Surely it is a modern trend to put more emphasis on the damaged myocardium as the causal factor in sudden death from coronary insufficiency.

Some recent work on the changes that take place in the body after death is reviewed. Fluid blood at autopsy is stated to be merely an indication of sudden death and is not necessarily indicative of an asphyxial death. During the war crimes investigations carried out in Europe after World War II a very large number of bodies was exhumed after burial for periods varying from a few months to several years. It became apparent that an estimation of the length of time for which the body had been dead and buried was much more difficult than was generally realized. Schourup's formula for determining the time of death is given. It is based on the concentration of lactic acid, non-protein nitrogen and amino acid in the cerebro-spinal fluid and the axillary temperature of the body at the time when the cerebro-spinal fluid is removed. The method has definite disadvantages, and indeed the discussion in this regard only serves to indicate the real need for more intensive research on this and many other problems in forensic medicine.

The effects of exposure of the body to cold and starvation are described, and reference is made to the callous experimental work by the Germans on human subjects under detention during the recent world war.

There is an account of the uses of physical aids in criminal science, such as microscopy, spectroscopy and photography. The value of electroencephalography is also assessed. The chapter dealing with modern trends in civil law in relation to medical practice should be of much interest to all doctors. The final chapters in the book deal with recent advances in toxicological analysis and the properties of some of the newer and more widely known insecticides and weed-killers, such as DDT *et cetera*.

The book is well set out, it is easy to read and it is amply illustrated. In addition to the 133 illustrations to the text there are two coloured plates and a number of helpful tables. At the end of each chapter there is a bibliography covering the material under discussion.

While there is information of interest to the general practitioner, the contents of this volume will be best appreciated by forensic pathologists, criminal barristers and other workers in this field.

Treatment of Mental Disorder. By Leo Alexander, M.D.; 1953. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Proprietary, Limited. 10" x 6¼", pp. 518, with 142 illustrations. Price: £4 15s.

THE author has made a very workmanlike attempt to consolidate our knowledge of the present status of physical treatment in psychiatry. The subject of electro-convulsive and sub-convulsive therapy is handled very well, and there is a valuable chapter on the electrical properties of the currents used. He emphasizes the value of non-convulsive (tonic) treatment, and it would appear that he prefers this method to the abolition of the convulsion by relaxants for the majority of conditions. The subject of relaxants is dealt with briefly.

The author describes very well the Reiter machine and its current modalities (this machine is not used in this country), but fails to acknowledge the work of Strauss and McPhail in the field of pulse wave electro-coma.

Although "written for students of medicine, and physicians" and "of special interest for young neuropsychiatrists", this book is a valuable aid to the clinical psychologist entering the field of the psychiatric clinic. Basing his work on the experience of twenty-three years of practice, teaching and research, the author systematically examines the many facets of mental disease and relates each topic to the recent advances in this field. Supported by the statistical conclusions from a large patient population, this book provides a comprehensive orientation to the total problem of mental disease, its recognition, treatment and prognosis.

This book, published in 1953, supplies a long-felt want to psychiatrists in actual practice, especially to those who are interested in the neuro-physiological aspects of the physical treatments. Chapter IX deals in a wonderfully clear manner with this aspect of electro-convulsive therapy, insulin coma and the various forms of psycho-surgery. Chapter X alone is a good reason for the study of this work, for here are put forth definitely and courageously the complications of physical treatments, and here are help and understanding for the unfortunate clinician who is in the toils with cases of irreversible insulin coma.

The book is a "must" for all psychiatrists who use any form of dynamic treatment.

A Guide to Obstetrics in General Practice. By William C. W. Nixon, M.D. (London), F.R.C.S. (England), F.R.C.O.G., and Eric B. Hickson, M.R.C.S., L.R.C.P., D.(Obst.), R.C.O.G.; 1953. London: Staples Press, Limited. 8½" x 6", pp. 302, with 35 illustrations. Price: 30s.

As the name implies, the authors, one the Professor of Obstetrics and Gynæcology at University College Hospital and one a general practitioner in Wiltshire, have tried to produce a book which will be a help to the general practitioner obstetrician.

They have coopted Dr. Harold Waller, lately pædiatrician to the British Hospital for Mothers and Babies at Woolwich, Dr. Shila Ransome, anæsthetist, and Dr. Elizabeth Tylden, psychiatrist, both of the obstetric department of University College Hospital, and so all problems of obstetrics that are met by the general practitioner are dealt with in this book.

The authors discuss most aspects of normal pregnancy and labour, and also some departures from the normal. They include ante-natal work with useful diets and exercises, and that most important but often neglected work, post-natal examinations and follow-up visits.

It is obvious that a great deal of the general practitioners' obstetrics is domiciliary, where they are dependent on the skill of the midwife, to whose aid they are frequently called.

The chapters contributed by Dr. Harold Waller on breast feeding, care of the premature child and diseases of the newborn are invaluable wherever obstetrics is practised. The difficulties so often associated with breast feeding smooth themselves out under this sane approach to them. Dr. Elizabeth Tylden and Dr. Shila Ransome also contribute valuable information from their respective departments.

It may therefore be said that the authors have more than fulfilled their aims. They have produced a book that is full of practical up-to-date orthodox teaching. Most general *practitioners who practise obstetrics will not regret adding* this book to their library.

Human Milk: Yield, Proximate Principles and Inorganic Constituents. By S. D. Morrison, B.Sc.; 1952. Technical Communication No. 18 of the Commonwealth Bureau of Animal Nutrition, Rowett Research Institute, Bucksburn, Aberdeenshire, Scotland. Slough, Bucks: Commonwealth Agricultural Bureaux. 8¼" × 5¼", pp. 100, with 12 text figures. Price: 10s. 6d.

THE composition of human milk and conditions affecting its secretion have been the subject of investigation for more than fifty years. In his monograph on human milk S. D. Morrison has reviewed and collated the results of some two hundred of these investigations. His review is restricted to consideration of total yield, and content of nitrogenous constituents, lipide, lactose, and the main inorganic constituents. Vitamin content has been excluded because this was the subject of a slightly earlier review. The main subdivisions of the work are: the effects of diurnal and seasonal variations, and of age, parity, and stage of lactation.

Even within the limitations imposed, the papers selected for discussion represent only a small fraction of those which have appeared during the period reviewed. Such a selection is necessarily somewhat arbitrary.

The author has performed a useful and laborious task in recalculating original numerical data when this was needed to make them comparable, presenting them in compact tables, and, in many instances plotting them as graphs. Where possible he has calculated standard deviations and thus made available more precise information on variability. The numbers of comparable results obtained ranged from about a thousand for nitrogenous constituents and lactose to two and three hundred for lipides and total inorganic constituents, and smaller numbers for individual components of the ash. It is interesting to notice that the least satisfactory quantitative information obtained was that for the apparently simple measurement of total yield, the quantity for which we have such precise information for the cow.

The monograph constitutes a valuable survey of much of the significant information available on the composition and yield of human milk.

Psychological Disorder and Crime. By W. Lindesay Neustatter, M.D., B.Sc. (Psy.), M.R.C.P., with a foreword by John Maude, Q.C.; 1953. London: Christopher Johnson. 8½" × 6", pp. 248. Price: 21s.

DR. W. L. NEUSTATTER, who has had extensive experience in forensic psychiatry, has written "Psychological Disorder and Crime" primarily to state a case for the wider use of psychiatrists in the examination and disposal of those who fall foul of the law. One of the popular fallacies which he disclaims is that the supposed unconscious motivation of an antisocial act thereby releases the offender from all responsibility. Nevertheless there is much to be said for the recognition of diminished responsibility in some cases that do not satisfy the conditions of the McNaughten rules. Indeed clemency is often exercised on mental grounds after a death sentence has been passed. The author reviews the crimes commonly associated with various mental syndromes with examples from the literature and from his own experience. A chapter is devoted to the electroencephalogram and epilepsy, wherein, as in other parts of the book, technical terms are explained for the benefit of the lay readers for whom this book is mainly intended. Dr. Neustatter states that violent or dangerous behaviour is rarely seen during post-epileptic automatism, which is not in accord with the opinions of some other authorities. Dr. Neustatter goes on to say "when they [epileptics] commit murder it is through some abnormal process occurring in their brain related to the epileptic fit, but not synonymous with it". Psychopaths, many of whom show a cerebral dysrhythmia, are a nuisance in prison and not altogether suitable for ordinary mental hospitals; a special institution half-way between prison and hospital is advocated. Opinions by three psychiatrists concerning the treatment of mentally unstable criminals and delinquents are included in an appendix. This book will prove useful to medical practitioners as well as to lawyers, magistrates and probation officers as a good introduction to a controversial subject.

Clinical Pediatric Urology. By Meredith Campbell, M.S., M.D., F.A.C.S., with a section on nephritis and allied diseases in infancy and childhood by Elvira Goettsch, A.B., M.D., and John D. Lyttle, A.B., M.D.; 1951. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 6¾", pp. 1126, with 543 illustrations. Price: £8 11s.

IN view of the advances made over the last few years in both general and pædiatric urology, the publication of this book by Meredith Campbell, of New York, is most timely and welcome. This is an exhaustive and, it goes without saying, authoritative treatise on the subject of urology in children, in which the author's experience, if not unequalled, must be unexcelled.

Practically no aspect of the subject is left untouched. Almost a hundred pages are taken up with a consideration of methods of examinations and diagnosis. In the course of them the author brings out two points which are not often stressed, that the most absolute contraindication to cystoscopy is ignorance or incompetence on the part of the operator, and that the value of urograms is largely dependent on the experience and skill of the interpreter.

The rest of the thousand odd pages are devoted to a systematic consideration of the various aspects of urology in children. Each section has its own extensive bibliography and—a good point—there is a section on nursing care in pædiatric urology, written by one of Campbell's associates, and another on nephritis in infancy and childhood, written by two collaborating physicians. This latter is a most valuable section, as the question of the presence or absence of non-surgical renal disease occurs much more often in pædiatric than in adult urological practice.

There is little to criticize in this book, and in any case differences of opinion between individual urologists must inevitably arise. Campbell, for instance, is a firm believer in the necessity for preliminary drainage before the surgical attack is made on obstructive lesions, whereas, in adult urological practice at least, the present trend is rather in the reverse direction. He does not mention the point—for that matter, he may not agree with it—that in the child the congenitally obstructed urinary tract that has never known normality only too often shows little or no tendency to become normal after the obstruction is removed, and that its reaction is far different from that occurring in its adult counterpart, which after appropriate surgery much more frequently reverts to its previous normal condition. In this connexion Campbell's statement that some patients with infravesical obstruction who show no improvement on continuous drainage—and so have no long-term future—are best treated by permanent cystostomy, is at least debatable.

One rather surprising aspect of an otherwise completely up-to-date book is that no mention is made of perirenal air insufflation, and a small section on the prevention of recumbency calculi in children is another minor omission.

Production is excellent, while the illustrations are ample and most adequate. The book inevitably takes its place among the urological classics.

The Pharynx: Basic Aspects and Clinical Problems. Edited by Abraham R. Hollender, M.D., F.A.C.S.; 1953. Chicago: The Year Book Publishers, Incorporated. 9" × 6", pp. 574, with many illustrations.

IN this book A. R. Hollender has produced a separate work dealing with direct and related problems concerning the pharynx. The publication of such a book has been long overdue. Embodying, as it does, recent developments where applicable in general medicine and in oto-rhino-laryngology, it should prove of great interest to both the oto-rhino-laryngologist and the student. Because of the large scope of the subject, the collaboration of nineteen medical teachers and clinicians was obtained. The author introduces the subject matter of each chapter and then finally comments on it. The end result is a most excellent production.

The first section of the book deals with basic aspects, namely, anatomy, physiology, pathology, bacteriology, methods and procedures for diagnosis and röntgenographic examination, and the second section with clinical problems. There are numerous well-drawn illustrations throughout the text and where necessary operative technique is included and clearly explained.

If any distinction is made, it should be stated that a useful chapter is the one on oral and pharyngeal manifestations of diseases of the blood. That dealing with abscesses of the pharynx, particularly the sections on retropharyngeal and pharyngeal abscesses, is very good, and even better is the chapter on infections of the neck.

Of interest, too, is the subject of tonsillectomy and adenoidectomy in the allergic child.

Commencing with some comparative anatomy, some nineteen very interesting pages are devoted to the palatal uvula, structure, function and significance, and in them the fact is deplored that text-books, including "Gray's Anatomy", briefly describe the uvula as a vestigial structure, and therefore almost functionless and insignificant.

There are copious references at the end of each chapter. An error has been noted on page 395, namely, Figure 22b should read "below right" and Figure 22c "below left".

The book is to be highly recommended and should be an acquisition to every oto-rhino-laryngologist's library.

Survey of Clinical Pediatrics. By Lawrence B. Slobody, M.D.; 1952. New York: McGraw-Hill Book Company, Incorporated. 9½" × 6½", pp. 480. Price: $7.50.

DESCRIBED as "a focus on the highlights of pediatrics", this book is in fact a synopsis of the whole field of clinical pædiatrics based on the notes used for teaching by the staff of the New York College of Medicine.

Although there can be little criticism of the information supplied, this method of supplying it cannot be generally approved; and while the condensation of some of the sections is admirable, it soon becomes obvious that brevity does not always lead to ease of assimilation or understanding. In some sections, for example that on "psycologic problems", compression seems to have been achieved by the use of unhelpful generalities, while in others an excessive pithiness has led not unnaturally to indigestibility.

The chapter on gastro-intestinal conditions is a good example of the book's weakness. In twenty-two pages it deals with colic, vomiting, constipation, diarrhœa, Hirschsprung's disease, cœliac disease, cystic fibrosis of the pancreas, ulcerative colitis, infectious hepatitis and intestinal parasites.

The recommendations for the treatment of cœliac disease are already out of date, and although the need for a diet with a high protein content for children with cystic fibrosis of the pancreas is mentioned, there is no information as to how it is to be achieved; in fact there is no mention anywhere in the book of dietetics outside the routine feeding of infancy.

The notes on the treatment of severe diarrhœa are dangerously inadequate, and among other doubtful statements fluid replacement at the rate of two and a half ounces per pound per day is recommended without mention of the initial relief of dehydration or of allowance for continued increased fluid loss. It is true that the reader is referred to the chapter on fluid and electrolyte balance, but this section itself, while intelligible to those already familiar with the subject, is far too compressed to be generally useful.

Despite these criticisms the book does contain numerous examples of useful information admirably condensed or tabulated, and had the author been content to produce a smaller book containing a practical selection of these it would have filled a very useful purpose. As it is, the author strives to cover too large a field and the result suggests that the book presents all about pædiatrics for those who have no interest in the subject. It would be a dangerous book for students, and certainly would not satisfy the competent practitioner.

The Classification of Pulmonary Tuberculosis. By Milosh Sekulich, M.D.; 1953. London: William Heinemann (Medical Books), Limited. 8½" × 6", pp. 360, with 148 illustrations. Price: 63s.

PULMONARY TUBERCULOSIS is a disease of such diverse clinical and pathological manifestations that it would seem almost impossible to arrive at a classification which, while being simple and easy to understand, is at the same time sufficiently comprehensive to cover all cases. Milosh Sekulich in his book has made a brave and successful attempt to accomplish this difficult task. His classification differs from many others that have gone before in that it covers the type, the extent, and the degree of activity of the lesions and is based on pathological, pathogenetic, clinical, radiological, and even prognostic and therapeutic considerations in each case.

The pathological types are grouped under four main headings—inflammatory, caseous, fibro-caseous, and fibrous forms—and these are further subdivided. The classification is first presented in diagrammatic form followed by a description of the principles on which it is based. A detailed account of the four main groups and their subgroups is followed by illustrative cases.

The author worked for thirteen years in association with Professor Radosavljevic at Belgrade University and later at various London clinics. His material is well presented and his contentions are soundly based. He has produced a book which is interesting and instructive. It is easy to read, written in impeccable English, and profusely illustrated. It is a book well worth study by everyone interested in the problems of pulmonary tuberculosis. Whether the classification will receive universal acceptance, only time can tell.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"A Practice of Thoracic Surgery", by A. L. d'Abreu, O.B.E., Ch.M., F.R.C.S.; 1953. London: Edward Arnold and Company. 10" × 7½", pp. 600, with 345 illustrations. Price: 80s.

This book sets out the author's own practice of thoracic surgery.

"Memórias do Instituto Oswaldo Cruz, Rio de Janeiro—Brasil", Tomo 48, commemorativo do Cinqüentenário do Instituto Oswaldo Cruz; 1950. Rio de Janeiro: *Serviço Gráfico do Instituto Brasileiro de Geografia e Estatística.* 10" × 7½", pp. 746, with many illustrations.

Consists of some thirty-eight contributions, seven of which are in English, the rest being in Portuguese.

"Textbook of Histology", by José F. Nonidez, D.Sc., and William F. Windle, Ph.D., Sc.D.; Second Edition; 1953. New York, Toronto and London: McGraw-Hill Book Company, Incorporated. 9" × 6¼", pp. 544, with 326 illustrations, composed of 214 drawings and diagrams and 233 photomicrographs. Price: $9.50.

Intended for the beginner and not for a reference book.

"Medicine for Nurses", by M. Toohey, M.D., M.R.C.P., D.C.H.; 1953. Edinburgh and London: E. and S. Livingstone, Limited. 8½" × 5½", pp. 604, with 152 illustrations. Price: £1 8s.

Intended to help the nurse during her training and to serve as a reference book for her afterwards.

"Disease and its Conquest", edited by G. T. Hollis, Hon. M.A. (Oxon.), with a foreword by Maurice Davidson, M.A., M.D., B.Ch. (Oxon.), F.R.C.P. (Lond.); 1953. London, New York and Toronto: Geoffrey Cumberlege, Oxford University Press. 7½" × 5", pp. 172. Price: 15s. 9d.

Intended for "educated persons" among the general public.

"The Hygiene of Marriage", by Isabel Emslie Hutton, C.B.E., M.D.; Ninth Edition; 1953. London: William Heinemann (Medical Books), Limited. 7¼" × 5", pp. 176, with six illustrations. Price: 12s. 6d.

The first edition was published in 1923.

"Food Inspection Notes: A Handbook for Students", by H. Hill, F.R.San.I., F.S.I.A., A.M.I.S.E., and E. Dodsworth, F.R.San.I., M.S.I.A., M.Inst.P.C.; Fourth Edition; 1953. London: H. K. Lewis and Company, Limited. 7" × 4½", pp. 136. Price: 8s. 6d.

The first edition was published in 1943.

"Diseases of Muscle: A Study in Pathology", by Raymond D. Adams, M.A., M.D., D. Denny-Brown, M.D., D. Phil., F.R.C.P., and Carl M. Pearson, M.D.; 1953. New York: Paul B. Hoeber, Incorporated. 9½" × 6½", pp. 572, with 347 illustrations. Price: $16.00.

Originally planned as a pathological study of muscle, this book now covers the whole class of diseases of muscle, together with the related anatomy and physiology.

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PERIODICAL HEALTH EXAMINATIONS.

IN July last year an account was given in these columns of preventive health examinations carried out in Georgia, United States of America. This work was effective but unusual. It was effective because in six years more than one million persons had voluntarily submitted themselves to multiple health tests. It was unusual because people were asked to submit themselves to tests, not to physical examinations. There was probably some psychological insight in this method, because the idea of tests appeals to many folk—they are having something actually done to them or for them. By this means they are brought to the point of thinking about their own well-being. The Georgia people use the performance of a test as a stepping stone for full medical examination: "We wish to make it plain that these tests do not in any way take the place of a physical examination by your family physician. We recommend that in the interest of good health you should see your family doctor at least once a year for a complete physical examination." The idea of regular examinations for apparently healthy people has often been advanced during the last few years. The difficulties associated with the idea are two—the fact that people have to be made to seek the examination, and the thoroughness with which it has to be made by the medical practitioner. A practitioner who has been used to seeing a patient at odd intervals over a number of years does not notice minor changes in his appearance and it is fatally easy for him to assume that all is well, and without the exercise of sufficient care, to mislead the patient. The old saw that "to err is human" is never truer than it is here.

In order to stimulate interest in this subject attention should be drawn to two recent reports.[1] The first is by R. P. McCombs and J. J. Finn, junior, and deals with the examination of 7677 persons. In December, 1949, the Massachusetts Department of Public Health, with the sponsorship of the Massachusetts Medical Society, set up "a pilot multiphasic screening clinic" at the New England Center Hospital, using the facilities of the Pratt Diagnostic Clinic. Many abnormal findings were recorded and the results of examinations were sent to the medical practitioners named by the persons screened. No attempt was made to establish diagnoses or to recommend treatment. Unfortunately about one-third of the patients did not present themselves to their doctors, in spite of repeated advice by mail and by social workers to do so. In many cases it was obvious that urgently necessary follow-up studies were not carried out. Naturally the conclusion was reached that there were certain dangers inherent in the method. The most important was the false sense of security given to patients who believed that they were free of disease after being examined in the clinic. No claim was made, for instance, that persons were completely examined for malignant lesions, yet many had presented themselves for that very purpose and often went away believing that all possibility of cancer had been excluded. The second major objection to the method was that there was a distinct break between the initial screening examination and the suggestion that follow-up studies by the family doctor were necessary. There would, of course, be another delay before the family doctor concerned was able to initiate the studies. In 1951 the Pratt Diagnostic Clinic was asked by an insurance company to undertake an examination of its employees forty-five years of age and over. In the light of previous experience it was agreed to arrange that diagnostic procedures could be carried out when significant findings emerged from the screening tests. The technique adopted included the filling in by the employee of a form containing 222 questions. Positive answers were investigated. Blood was drawn for hæmoglobin and sugar determinations, for serological testing and for the sedimentation rate estimation, and urine was obtained for albumin and sugar determinations. Height and weight were estimated and an audiogram was taken. One lead of an electrocardiogram was taken and a vision test was made. The patient was then undressed and X-ray examinations were made. The physician then made an examination. Among the examinations were inspection of the ocular fundi and a rectal examination; a pelvic examination of women was made whenever possible. This process took sixty-two minutes. Further studies were made when necessary. In all, 563 persons (296 men and 287 women) were examined in this way and 1605 abnormalities were found. For our present purposes these need not be enumerated. The results of examinations were sent to the family doctors. It is of interest to note that of 1198 defects, 586 were discovered by routine tests, 142 by analysis of the *questionnaire*, and 470 by the physical examination. The summary of the examination of 583 supposedly well persons shows that cancer was present in one of 146 cases; significant tumours from which cancer had to be excluded were present in one of 18 cases. Significant heart disease, not previously recognized, was present in one of 25 persons. Moderately severe hypertension was present in one case in 20. Previously undiagnosed duodenal ulcers were found in one in 58 employees. Cases of previously undiagnosed diabetes numbered one in 48. One person in 15 had an easily

[1] *New England J. Med.*, January 29, 1953.

recognizable psychiatric condition. Nearly half the group had less than perfect vision with glasses. Who will say that these discoveries were not worth while?

The second report mentioned is from Maurice Fremont-Smith, who is clinical professor of preventive medicine at the Boston University School of Medicine. He makes the significant remark that if eventual control by the Government of the medical care of American people is to be avoided, greater emphasis must be placed on the early diagnosis of disease and its prevention. He thinks that a medical survey of the population cannot be standardized, and gives a "rough plan" of what he has evolved for himself. We do not propose to discuss this in detail, but would point out that he attaches great importance to the careful taking of a history, and, incidentally, he always inquires what medicines the patient is taking. He regards rectal and pelvic examinations as most important. He sets out in a table details of thirteen "positive" vaginal smears obtained from eight hundred consecutive new female patients. He has made the preparation of a vaginal smear a routine procedure. Of the 13 "positive" smears, one represented a false-positive reaction; ten patients had proven cancer and two are still under observation. This brings the conclusion that one out of about every hundred women coming in for routine physical examination had cancer of the cervix, all but one discovered in the non-invasive stage of the disease. It is of interest that in neither of these reports is the routine use of the Wassermann test discussed, though in the first serological tests are mentioned.

From these two interesting reports, we would pass to another[1] by W. Leigh Cook, junior, entitled "Periodic Health Examinations". Dr. Cook is assistant professor of medicine at the University of Pittsburgh. He presented his paper at the annual meeting of the American Public Health Association. Cook writes as a periodical health examiner and not as a family doctor. He describes the periodical examiner as an historian and not a prophet—he will give no prognoses. He is insistent on the need for honesty and integrity in health examinations and with this we shall all agree. Ideally the patient will see his own doctor if he has been through the mill of a routine examination by a health official. The regular attendant will be able to reassure the individual who needs reassurance—and many persons do. Cook, though rejecting the role of prophet, writes that one advantage of periodical health examination is "reassurance to persons with known disabilities concerning their success in having handled these problems". Surely reassurance as to what has happened (which will be more or less obvious to the examinee) must imply some reassurance or at least encouragement about the future. The "historian" and the "prophet" must meet to a certain extent. The chief point to be made in regard to periodical health examinations, apart from their advocacy, is insistence on thoroughness and a spirit of inquiry rather than the adoption of a routine to satisfy or calm an anxious person. In private practice health examinations of the kind under discussion should not be undertaken in the course of ordinary consulting hours, for then they will be hurried, but should be arranged for a time for which a special appointment has been made.

[1] *Arch. Indust. Hyg.*, March, 1953.

Current Comment.

FRACTURE-DISLOCATION OF THE PELVIS DURING LABOUR.

WHAT must be an extremely rare form of pelvic injury during labour has been reported by M. R. Urist, of Los Angeles.[1] In this instance, fracture-dislocation of the pelvis was accompanied by injury to the lumbo-sacral trunk and the first sacral nerve root. The patient was a woman, thirty-seven years old, who was pregnant for the third time. Spontaneous delivery occurred six days after the expected date of confinement following a labour which lasted for two hours. The infant weighed ten pounds ten ounces. No anæsthesia was used except local infiltration of the perineum with procaine for episiotomy. The patient was fully awake at about one and a half hours after the onset of labour, when she experienced a sudden sharp pain and heard a loud cracking sound and felt as though something had burst in the left sacro-iliac region. The pain became localized in this region and radiated into the left leg and foot. She also noticed a "lump" on the left side of the lower part of the back, numbness, tingling, coldness, and lack of sensation in the left leg, together with weakness and "turning" of the left ankle. These symptoms, with a waddling gait, continued until six weeks after the delivery, when an X-ray examination revealed a displaced fracture-dislocation of the left sacro-iliac joint and complete separation of the *symphysis pubis*. In one of the X-ray pictures there was a suggestion of subarachnoid hæmorrhage and possible traction on the left nerve root adjacent to the fracture of the sacrum. The patient's past history is of interest. In 1914, at the age of eleven years, she suffered from what was regarded as curvature of the spine. Her first pregnancy occurred in 1938 and resulted in normal delivery. During her second pregnancy in 1942 she was discovered to be suffering from syphilis. This pregnancy was terminated by a therapeutic abortion. The syphilis was promptly treated and the patient has had a "negative reaction to the Wassermann test since 1943". Urist attaches some importance to the fact that the patient had experienced repeated attacks of pain in the lower part of the back radiating into the left leg for five years before the incident he describes. The pain increased in intensity, and during the last three months of her pregnancy she had a waddling gait and complained to her medical attendant of low back pain. These symptoms were alleviated by the use of a lumbo-sacral corset. It is of interest to note that the treatment adopted after the occurrence of the fracture-dislocation consisted of manipulation which apparently was not effective. X-ray examination one year after the date of the injury showed the same amount of displacement of the *symphysis pubis*, but the sacro-iliac joint was solidly ankylosed.

The chief interest of this case lies in the reason for its occurrence. In our account of the history no mention has been made of the associated injury to the lumbo-sacral trunk or to the first sacral nerve root. These were probably incidental to the injury. Urist points out that the patient had a preexisting disorder of the spine. He states that the pelvic ligaments and the specialized fibrocartilage of the pelvic synchondroses undergo progressive modification during gestation. He thinks that the pelvic joints during labour act as shock absorbers rather than as simple seams of expansion. He has something to say about the hormone control of the pelvic ligaments during pregnancy. In this case it would be necessary to assume that there had been some interference with this hormone control. Whether the syphilis from which the patient had suffered had anything to do with the occurrence would be open to question. Reference to text-books on obstetrics fails to reveal any case similar to that reported by Urist. He, however, refers to a report of twenty cases of injury of the lumbo-sacral plexus caused by prolonged or difficult labour and a large baby. This series was reported by King, who did not mention associated fracture of the pelvis in any instance. Urist thinks that perhaps the damage to the lumbo-sacral

[1] *J.A.M.A.*, May 9, 1953.

plexus may be more serious when it occurs without a fracture than when the pelvic joints are able to give way, which must be seldom.

TOXIC EFFECTS OF DRUGS USED FOR THE TREATMENT OF PETIT MAL.

MINOR EPILEPSY is one of the long-term maladies which needs some patient supervision, and in common with other diseases for which new drugs are available, it now needs more than casual care, for toxic effects may appear. "Dilantin" (sodium diphenyl hydantoinate) has now been in use for some time, and may occasionally give rise to tremor and other neuromuscular phenomena, as well as a curious hyperplasia of the gums. More recently members of the oxazolidinedione group have been observed to cause abnormalities in the urine discovered by microscopic examination, and J. G. Millichap and Brian H. Kirman have published an account of cases observed by them.[1] This work follows up the findings of Millichap last year, in which it was shown that hæmaturia and the appearance of granular casts occurred after the administration of "Milontin".

Half of a series of children treated with this drug showed these effects, but no sequels were found. Now Millichap and Kirman report that of twelve boys treated with "Tridione" (troxidone), eight showed signs of glomerulo-tubular damage within eight weeks of the start of treatment. Two patients had also casts or blood cells in the urine some weeks after the withdrawal of the drug. Five controls remained unaffected. Another group of children had casts and red cells in the urine after the administration of "Malidone" (aloxidone). In most instances no protein was found in the urine. Care was also taken that no urinary abnormality was present before treatment began. Since proteinuria and casts may be observed in the urine after the occurrence of major epileptic fits, children in whom these had occurred were excluded from the tests. The interest in this work lies not merely in the finding of a particular side effect as a complication by certain groups of drugs, but in the different behaviour of individual members of the group. It should be noted that the finding of urinary abnormalities had previously been recorded after the use of one of these drugs, troxidone, but not after aloxidone. This experience shows that it is not safe to entertain any feeling except that of suspicion with untried drugs, even though other substances with similar structural formulæ might be assumed to have similar properties. The authors emphasize that discrimination in choice of a drug belonging to this group should be exercised, since evidence of renal trouble was found not only during administration of one drug, but also after it had been withdrawn. They further suggest that regular microscopic examination is advisable whenever such preparations are given in large or moderate doses.

THE EFFECT OF PREGNANCY ON CHRONIC LEUCHÆMIA.

CHRONIC granulocytic leuchæmia is not a very uncommon disease; in fact it is common enough to provide opportunities for adequate study of the therapeutic possibilities, though the results do not give much ground for optimism. Harold Shub, Maurice M. Black and Francis D. Speer have described the case of a young woman who suffered from chronic granulocytic leuchæmia, and died from an acute exacerbation coincident with pregnancy.[2] She had been under observation and treatment for a characteristic myelogenous leuchæmia, and had been somewhat relieved by treatment with urethane. Some months later radiation therapy was considered, and after further investigation in hospital she was discharged and weekly doses of radiation were begun. The duration of the leuchæmia was then at least eighteen months. Less than a year later she was found to be deteriorated in condition and was over five months pregnant. Blood examination revealed 36,000 leucocytes per cubic millimetre, with myeloblasts predominating. The bone marrow was hypercellular; most of the cells were myeloblasts and "stem" cells. Several mild hæmorrhagic episodes occurred, but after ten days she became rapidly worse and died. The rapid transformation of the leuchæmia to an acute form turned the authors' attention to the literature where they were able to find accounts of 53 coincident cases of chronic myelogenous leuchæmia and pregnancy. Only 25 of these gave sufficient data to relate the onset of the leuchæmia or the length of survival to pregnancy. The coexistence of the two conditions is apparently rare, possibly, as Shub, Black and Speer suggest, because of general deterioration in physical state, and of lowered ovarian function. Further, patients with chronic leuchæmia usually show progressive failure for a number of months before death. These considerations support the belief that this patient's disease was of the more benign type when she became pregnant. Eight of 25 patients described in the literature died within an average period of two and a half months after delivery, indicating that the influence of pregnancy was unfavourable.

The authors further analyse a group of 33 patients suffering from leuchæmia of known length of duration and find that their periods of survival were shortened by pregnancy below that which might have been otherwise expected. They also find some analogous cases in which pregnancy has initiated an acute exacerbation of the leuchæmia. Indeed, in about one-third of the leuchæmic patients, who were also pregnant, death in exacerbation followed the birth by some eight months. The lethal event was not hastened by the duration of the disease *per se*, but except to say that it must have been hastened by pregnancy, the authors do not suggest any details of the possible mechanism. The bone marrow must, of course, be subjected to undue strain by the demands of a growing fœtus: one might even speculate concerning possible endocrine activities and wonder if here there might be still some hidden facts in this disease. We know, for example, that receding leucocyte counts in chronic leuchæmia are not of necessity of a good prognostic value, and also that leuchæmic infiltrations in the viscera may appear even though the total leucocytes in the circulating blood are not increased above the average number. It may be freely conceded that pregnancy, however unlikely, should be avoided in leuchæmia, but more than that cannot be said with any real certainty.

[1] *Lancet*, May 30, 1953.
[2] *Blood*, April, 1953.

TUBERCULOSIS AS A HAZARD IN THE POST-MORTEM EXAMINATION ROOM.

AT a meeting of the Association of Clinical Pathologists held in Great Britain in January, 1950, a discussion took place on infection with tuberculosis as a hazard in the post-mortem examination room. It was decided to refer the question for examination by the Committee on Histopathology, and the results of the subsequent investigation form the substance of a recent paper by G. Stewart Smith.[1] In introducing the subject, Smith refers to published findings from Sweden and America which suggest, although they do not prove, that the post-mortem examination room may be a centre for the dissemination of tuberculosis. He goes on to point out that the people studied in these surveys were medical students; if they run a risk, there may be an even greater hazard to pathologists and post-mortem attendants, who spend much more time in the post-mortem room, though in general they are of a less susceptible age group. To obtain sufficient data on the matter the Committee on Histopathology sent a preliminary *questionnaire* to all members of the Association in charge of departments, asking for their personal observations on the occurrence of

[1] *J. Clin. Path.*, May, 1953.

tuberculosis among medical or other staff concerned with post-mortem examinations. Replies were received from 107 departments covering over 192,000 necropsies, in about 9000 of which active tuberculosis was present. The initial figures showed that of those concerned, 12 members of medical staffs and 14 of technical staffs had developed tuberculosis; but further investigation made it clear that, although the source of infection in such cases is always difficult to determine, an obvious alternative source had to be accepted in a number of cases. This left only two doctors and eight technicians who might have acquired tuberculosis in the post-mortem room, and even in some of those cases the evidence left the matter very open. These "positive" figures, as Smith points out, are not large, considering the extent of the survey, and it must be conceded that of themselves they do not seem to constitute a *prima facie* case for considering the post-mortem room as a serious source of tuberculous infection for the staff working in it. It is interesting also to note that in the survey pathologists with the largest experience of big departments tended to record the lowest incidence of tuberculosis among their staffs, most of them sending a negative return.

Smith makes the comment that a limited inquiry of this type leaves many questions unanswered. Some correspondents raised the question of the laboratory as an important source of infection, but it is not covered by the terms of the present survey. In any case, among people handling material from cases of active tuberculosis there must be some risk of infection, as Smith points out; and even if the figures produced by the survey do not make it seem very considerable among those working in the post-mortem room, adequate precautions should be taken. The American and Swedish reports previously mentioned leave no doubt that tubercle bacilli from post-mortem subjects frequently contaminate towels, trays, dust on tables (for as long as twenty-four hours, in spite of the usual precautions as regards cleanliness) and, most significant, the atmosphere. The most important precautions recommended by Smith are the fixation of tuberculous lungs in formalin before they are opened and avoidance of scraping the cut surfaces of tuberculous lungs in the fresh state.

ANÆMIA IN RHEUMATOID ARTHRITIS.

THE occurrence of anæmia in rheumatoid arthritis is well known. Doubtless the picture of the typical sufferer from this disease springs to the mind readily, even if we allow for the difficulty in estimating "poverty of blood" from the apparent pallor of the patient. But though anæmia is easy to demonstrate in a patient with rheumatoid arthritis, and though it has no unusual qualities that can be simply demonstrated, it is sometimes far from simple to cure. It has been thought to be of dietetic origin, and indeed this may still be a factor, owing to the fantastic ideas which are still found to hold sway with faddists who deprive an already under-nourished person of essential items of food. It is usually moderate in degree, normocytic and hypochromic in type, and not associated with a blood or plasma volume of abnormal amount. M. R. Jeffrey in an article on the subject points out that the volume of the blood or plasma may appear to be raised somewhat beyond expectation because of the asthenic habit and lowered weight of many subjects of rheumatoid arthritis.[1] Jeffrey, in pointing out the practical difficulties of treatment, lays some stress on the loss of energy caused by a substantial anæmia, which may be responsible for a lassitude of sufficient degree to interfere with physiotherapeutic measures. He has studied in particular three aspects of the subject — the changes in the peripheral blood and bone marrow, the volumes of the blood and plasma, and alterations in the iron metabolism. The activity of the disease he estimated by such features as general signs and symptoms of disturbance of health, pain and tenderness in the joints, fever, loss of weight and alteration in the sedimentation rate. Where bias in classification was thought to be a possibility decisions were made by an independent observer. Investigations carried out included routine examinations of the blood, estimation of the fæcal urobilinogen content, marrow puncture, estimation of the plasma iron content, the iron-binding capacity of the serum, plasma volume, and the capacity to absorb a single dose of about 200 milligrammes of iron. The methods used kept closely to standard techniques. The author gives a brief discussion of the errors inherent in the Evans blue test used for estimation of the plasma volume. The numbers of patients so examined varied with the particular test; 16 subjects had marrow examination, in 100 cases tests such as routine blood examinations were made, and in 200 cases the plasma iron content was estimated. The results of the tests were as follows. The mean corpuscular volume was generally normal, and the mean corpuscular hæmoglobin content and concentration were as a rule reduced. Anæmia varied in degree in proportion to the activity of the arthritic process. Blood and plasma volumes showed no special divergence from the norm, except for the apparent variation referred to previously. The concentration of the plasma iron was usually reduced, the degree varying with the activity of the disease. One of the most interesting findings in such an investigation might be expected to be the capacity to absorb iron. This was found to be variable; some subjects responded very well after the fashion commonly seen in simple iron deficiency states, but others, in the words of the author, "gave strong presumptive evidence of impaired absorption". In discussing the results he summarizes the findings in 50 patients, 20 male and 30 female. Elevation of the iron-binding capacity of the serum was found in certain patients; this fell to normal figures after intravenous iron therapy and was believed to be due to iron deficiency. Gross reduction was found in one patient with very active disease. Consideration of the iron metabolism in these patients showed that anæmia or some other form of disturbed iron metabolism was common in patients with rheumatoid arthritis. This gave some support to the treatment of the anæmia with iron given intravenously, and Jeffrey, like other workers, found that the response was frequently good, but not invariable. Therefore, there appear to be three classes of anæmic patients with rheumatoid arthritis: those who respond to oral administration of iron, those who respond only to intravenous therapy, and those who do not respond to either. Excretion tests were not carried out in this series, but there appears no reason to attribute the anæmia to dietary deficiency, except as a minor cause. Work with radioactive iron is being carried out to test the point further. It would appear that there are factors which are still obscure, and this obscurity affects our understanding of both the perverted physiology of the condition and the therapeutic amenability of the disease. Perhaps these two are really one. Perhaps, too, we have here an illustration of a generalization which seems to have a good element of truth, that the commoner a phenomenon, the more difficult it is to understand completely. At least there is room for more work on the variable behaviour of anæmic states in rheumatoid arthritis.

[1] *Blood*, June, 1953.

INTRAARTERIAL BLOOD TRANSFUSION.

INTRAARTERIAL BLOOD TRANSFUSION offers appreciably more technical difficulty than the intravenous method. It has also certain potential dangers, such as gangrene of the forearm and hand following transfusion into the radial artery. On the other hand, it has been generally accepted that in certain circumstances an intraarterial transfusion will produce a resuscitative effect that is impossible, or at any rate unlikely, when the intravenous route is used. These advantages and disadvantages have been discussed in these columns in the issues of August 30, 1952, and May 16, 1953, and the view has been taken that intraarterial transfusion with the right indications has demonstrated advantages, although it is not to be lightly undertaken.

Now, however, the validity of some of these assumptions has been challenged in a paper from the department of physiology of the Harvard School of Public Health. The

authors, R. B. Case, S. J. Sarnoff, P. E. Waithe and L. C. Sarnoff,[1] carried out a series of laboratory experiments in which rapid intraarterial and intravenous infusions of blood and dextran were administered to dogs in a state of controlled hæmorrhagic hypotension. The infusions were given alternately in equal amounts and at similar rates. It was found that infusion by the intraarterial route did not increase the coronary blood flow or the arterial pressure either more rapidly or more effectively than that by the intravenous route. Similarly, the route of infusion did not change the effect on either right or left auricular pressure or pulmonary arterial pressure. These findings were observed in the dog with acute hæmorrhagic hypotension, in the dog with prolonged hæmorrhagic hypotension, in the dog unresponsive to blood replacement, and in the dog on the point of death. One dog on the point of death due to hæmorrhagic shock was given a rapid intraarterial infusion of all his lost blood, with no improvement in condition; in the ensuing five minutes and forty-five seconds, 455 mils of blood were perfused through the dog's left main coronary artery, and a prompt and sustained therapeutic response followed. Case and his colleagues suggest that, although insufficient coronary flow may be an important complicating factor of severe oligæmic shock, intraarterial infusion is no more effective than intravenous infusion in correcting that insufficiency. In a broader judgement they state that "more ample and convincing evidence should be available to substantiate the alleged advantages of intraarterial transfusion if it is to become as widespread a practice as seems to be the case". This statement is followed by a consideration in turn of the advantages claimed for the method by various of its advocates. While they do not dismiss these in any summary fashion, Case and his colleagues show the weaknesses of the arguments very clearly. On the other hand, they try to keep their own work in perspective. They do not consider that their experimental data constitute a contraindication to the clinical use of intraarterial transfusion in cases of oligæmic shock. They point out that their experiments were conducted on anæsthetized, open-chested dogs with positive-pressure breathing, whereas clinical shock is encountered most often in unanæsthetized men breathing spontaneously. "In addition, whenever an approximation of a clinical syndrome is attempted in the physiological laboratory, it must be interpreted as being just that, an approximation." Nevertheless, the findings are important and offer a healthy counter to overstatements of enthusiasm. The paper is not destructive; it merely brings the subject back into perspective.

POSTURE AND CARDIAC OUTPUT.

IT is generally assumed that in a state of cardiac emergency a lessening of the work imposed on the heart is achieved if the patient is nursed in the sitting or semi-sitting posture. Clinicians will probably agree that unless the existence of syncope, actual or threatened, dictates an almost prone posture, there are good arguments for allowing the patient to be propped up. When the physiological mechanism is sought the position is not quite as clear as may be assumed. Raymond Daley, in an article on the management of cardiac infarction, points out that there is still insufficient evidence concerning the cardiac output of such patients.[2] The reason for this he styles "obvious", because cardiac catheterization should not be performed in patients specially susceptible to arrhythmias. It may seem at first sight surprising that an inquiry demanding such bold measures should be carried out at all, but K. W. Donald, J. M. Bishop, G. Cumming and O. L. Wade have just published their findings from a research into the effect of nursing positions on the cardiac output in man.[3] They remark that the assumption that the work required of the heart is less in the sitting posture than in the supine is based on the knowledge that the change from the supine to the upright posture is accompanied by a fall in cardiac output. Therefore they made elaborate investigations on a series of subjects in hospital so as to compare the output when the subject was lying flat with one pillow, and when he sat up in bed with the legs extended and the back supported at 70° from the horizontal by a cardiac wedge or pillows. The authors mention various methods used for making these determinations, in particular the direct Fick method, which gives higher readings than the previously used acetylene method. Published results have been somewhat discordant so far; work with the ballistocardiograph, for example, has shown little change in cardiac output in different postures, but appreciable change in different individuals. With the direct Fick method it is recognized that the subject must be in a stable physiological state; this requirement was given special attention in the present series, by allowing a considerable time to elapse between different phases of the experiment. The subjects were divided into two groups each of 18 patients, of whom five were normal persons; one group contained three subjects with a high resting cardiac index, and the other three with a low index. A number of patients were included with mitral stenosis, and other forms of cardiac disease, and a number had hyperthyroidism. The actual tests represented an almost unbroken series of cardiac catheterizations. The routine adopted was to give each subject 500,000 units of penicillin and 0·5 gramme of sulphamezathine every six hours for twenty-four hours before and after the catheterization. Three hours before the test 6·0 grammes of quinidine and doses of "Sodium Amytal" were given, and half an hour before, 50 grammes of glucose in a drink. The other procedures were carried out in a quiet X-ray room. An indwelling needle was placed in the brachial artery, and a cardiac catheter was introduced through a vein in the left antecubital fossa into a pulmonary artery and the position verified radiographically. The intracardiac and pulmonary artery pressures were recorded, a direct method lasting through two respiratory cycles being used. Spirometer readings were taken, and a full range of gas and blood analyses were made with the usual precautions of technique. The authors frankly mention several shortcomings in their experiments, such as taking mixed samples of venous blood instead of samples from the pulmonary artery, but these were not significant in the whole series. Two measurements of cardiac output were made in each subject, in both the supine and the sitting positions. It is not possible to traverse here the analysis of the authors' results; tables and scatter diagrams of the various readings and determinations are given in the published text, and fuller details are available. The conclusions drawn were as follows. The measurements were found to be reliably repeated, and the standard error of a single error was 8·1% of the cardiac output in the supine, and 7·7% in the sitting posture. The effect of change of posture varied in different subjects; in the whole series there was a mean decrease, which was statistically significant, but too small to be of importance. In all subjects the pulse pressure in both pulmonary artery and right ventricle was diminished on their sitting up. This change in posture was accompanied by a decrease in pulmonary artery mean pressure only in patients with pulmonary hypertension.

It would seem that the difference in cardiac output as measured in the supine and the sitting subject is not of such degree as to be highly important as a clinical consideration. There are, of course, other factors related to the circulation and the respiratory function which should be considered, but this careful and painstaking work has given us a sounder physiological background for drawing conclusions at the bedside. It may be pointed out that the whole handling of a patient with a cardiac disability should be planned with regard to his comfort and safety, the two considerations should be to some degree related, and therefore it should be easier for the routine of hospitals to allow a patient for whom the sitting posture is desirable to assume this position readily.

[1] *J.A.M.A.*, May 16, 1953.
[2] *Post Grad. M. J.*, July, 1953.
[3] *Clin. Sc.*, Volume XII, Number 2.

Abstracts from Medical Literature.

MEDICINE.

The Stomach in Chronic Pulmonary Suppuration.

M. E. DAILEY AND H. C. BARTON (*Dis. Chest*, March, 1953) state that gastroscopic examination of 17 patients with bronchiectasis or lung abscess revealed a quite normal gastric mucous membrane in all but two instances, in which the abnormality was slight. They suggest that the ingestion of small amounts of purulent material in cases of suppurative gingivitis or chronic sinusitis is not harmful to the stomach.

The Two-Step Exercise Test.

A. M. MASTER, L. PORDY AND K. CHESKY (*J.A.M.A.*, February 7, 1953) present a follow-up investigation of 300 patients with chest pain and normal resting electrocardiograms. The study confirms the value of the Master two-step exercise test in clinical cardiac diagnosis and prognosis. The Master two-step exercise test furnishes objective corroborative evidence of the presence of coronary insufficiency in clinically suspect cases in which the resting electrocardiogram is normal. Negative findings in single and double two-step tests practically, although not absolutely, exclude the presence of coronary insufficiency. One case of coronary occlusion occurred among the 150 patients with negative results from two-step tests, during the entire follow-up period of from three to four years; and only one death took place in this group (from carcinoma of the stomach). A positive result from a single or a double two-step test provides confirmatory evidence of coronary insufficiency, either of organic or of functional origin. Twelve deaths were observed in this group of 150 cases, 10 resulting from coronary occlusion. The authors state that the Master two-step exercise test is invaluable in industry as well as in private practice, and it is a safe, sensitive and practical procedure if carried out as described by Master.

Complications with Antimicrobial Agents.

M. FINLAND AND L. WEINSTEIN (*New England J. Med.*, February 3, 1953) discuss the complications of use of antimicrobial agents. They state that skin lesions, often with fever and pruritus, are often associated with sensitization. Morbilliform, urticarial, vesicular, bullous and purpuric lesions may occur. Sulphathiazole and concentrated large doses of penicillin or streptomycin may cause local inflammatory reactions. Treatment in all these conditions consists of stopping administration of the drug responsible and giving antihistamine drugs and cortisone and ACTH, though these have their complications also. Oral lesions, especially ulceration, occur with the administration of aureomycin, "Chloromycetin" and terramycin. Lozenges or troches are the worst offenders. Contact dermatitis is frequent in chemists, nurses and doctors. Drug fever may accompany the rashes in all these complications. Vitamins do not cure the oral lesions. Lozenges and troches are particularly dangerous, and ointments and oily suspensions applied to the skin are almost equally so. Angioneurotic œdema and serum sickness often follow penicillin or streptomycin therapy. Acute anaphylaxis is rare. *Periarteritis nodosa* and disseminated *lupus erythematosus* have been ascribed to hypersensitivity and even to administration of the antimicrobial agents, especially repeated use of sulphonamides or antibiotics. Acute hepatitis has followed the repeated use of sulphathiazole, with drug fever and rashes associated. Patch tests are not reliable in demonstrating the relationship between the drug used and the complication associated with it. Nausea, vomiting and diarrhœa may occur with oral administration of aureomycin, terramycin, "Chloromycetin" or penicillin. Acute monilial stomatitis and pharyngitis may occur and extend down the gastro-intestinal tract. Nephritis may occur with administration of sulphonamides (rarely), of streptomycin and of polymyxin, bacitracin and neomycin. The last three should be used only in special cases in which other antibiotics have failed. Intrathecally administered penicillin and streptomycin may cause serious lesions of the spinal cord. Mild anæmia may occur with sulphonamides and antibiotics, but severe aplastic anæmia may follow the use of "Chloromycetin". The use of antibiotics may encourage the growth in the throat, bowel or female genitalia of organisms not susceptible to the preparation used. *Proteus vulgaris, Pseudomonas æruginosa, Staphylococcus aureus* and monilia (*Candida albicans*) may increase considerably. In children *Hæmophilus influenzæ* may replace Gram-positive coccal infections when penicillin is used, giving rise to new pneumonic infections or changes in the bacteriological state of the urinary tract. Localized abscesses due to *P. vulgaris* or *Bacillus welchii* may occur at the site of penicillin injections. Organisms have become resistant to all the antibiotics, especially staphylococci, which have become less and less sensitive to penicillin, aureomycin and terramycin. Similarly, the hæmolytic streptococci have become resistant to sulphadiazine when used prophylactically for a long period. The authors suggest that the preparations mentioned in their review should not be used unless absolutely necessary.

Shock following Myocardial Infarction.

THEODORE R. FINK, CARL J. D'ANGIO AND SOL BILOON (*J.A.M.A.*, April 4, 1953) discuss shock following myocardial infarction, and present their clinical observations on 15 patients. The patients are divided into two groups: (*a*) those with low venous pressure who responded to the use of "Neo-Synephrine Hydrochloride" by a rise in both venous and arterial pressures; (*b*) those with high venous pressures who responded to the administration of lanatoside *C* by a rise in arterial pressure and in some cases by a fall in venous pressure. It is thought that the first group of patients represent subjects of shock not unlike that met with after trauma, and that the second group were in a state of severe heart failure. The use of intravenous plasma therapy, intraarterial transfusion, or administration of "Neo-Synephrine Hydrochloride" in the treatment of the second group in the presence of high venous pressure appears clearly contraindicated.

Heparin in the Treatment of Angina Pectoris.

MAXWELL J. BINDER *et alii* (*J.A.M.A.*, March 21, 1953) report a clinical study with 34 patients, to whom 100 milligrammes (10 mils) of heparin was given intravenously twice per week. Its effect was compared with that of 10 mils of isotonic sodium chloride similarly given. In some patients, a month of heparin preceded a month of sodium chloride therapy, whilst in others the sequence was reversed. The study failed to demonstrate any beneficial effects of heparin administered in this way.

The Prognosis of Hyperthyroidism Treated by Antithyroid Drugs.

D. H. SOLOMON *et alii* (*J.A.M.A.*, May 16, 1953) report the findings in a series of 100 patients observed for four years after antithyroid drug therapy. They found that hyperthyroidism can regularly be controlled so long as treatment is continued. After a single course, 55% of subjects remained euthyroid, the remainder experiencing relapse after varying intervals up to four years later. Second and third courses gave lower remission rates than the first, but increased the total number of patients with prolonged remission up to 70% of the total series. A decrease in the size of the goitre during treatment was found to improve the final prognosis significantly. Primary hyperthyroidism and a small diffuse goitre also favour the occurrence of a prolonged remission.

Management of Acute Pancreatitis.

J. E. BERK (*J.A.M.A.*, May 2, 1953) discusses the conservative management of acute pancreatitis and the underlying principles involved. He states that the pain is best controlled by meperidine hydrochloride (pethidine), perhaps combined with simultaneous administration of nitrites. Tetraethylammonium chloride is also effective, but its side actions prevent its use for acutely ill patients. The anticholinergic actions of methantheline bromide ("Banthine") and hexamethonium bromide are also useful. In some cases, intravenous administration of procaine hydrochloride or nerve block, either paravertebral sympathetic block or splanchnic block, may be necessary. There may be disturbances in carbohydrate metabolism, and if glucose is used in fluid replacement, it should be given cautiously. Large amounts of calcium may be cast into areas of fat necrosis, and the degree of hypocalcæmia bears a close relationship to the severity of the disease and is of definite prognostic import. Depletion of potassium is also common. Reduction of pancreatic secretory activity is important, and may be attained by starvation in the acute stage, gastric suction, subcutaneous administration of phenobarbitone and administration of "Banthine" or ephedrine. Finally, the importance is stressed of combating infection and peritonitis with penicillin and aureomycin. Mention is also made of the possible use of a trypsin inhibitor and ACTH. If, despite these measures, improvement does not take place,

surgery may become necessary and should be as conservative as possible.

Adrenocortical Steroids.

G. W. THORN *et alii* (*New England J. Med.*, February 6, 1953) discuss pharmacological aspects of adrenocortical steroids and ACTH in man. They state that the first adrenal steroid to be synthesized was 11-desoxycorticosterone. There is doubt whether this steroid occurs in the adrenals, but it is the most potent steroid for control of sodium and potassium urinary excretion. It causes retention of sodium, chloride and water, and increased excretion of potassium. In Addison's disease, this effect is produced by one to three grammes per day. In health, 10 grammes per day are necessary to produce the same results. Desoxycorticosterone produces a considerable fall in the sodium and chloride content of the sweat and saliva, and a rise in the potassium content. Gastro-intestinal upsets in patients with Addison's disease may be due to failure to absorb sodium and chloride from the lumen of the bowel. In the body cells, an increase of sodium and decrease of potassium have been noted during treatment with desoxycorticosterone. Overdosage of this preparation may cause sodium retention, potassium deficiency, œdema, hypertension and enlarged heart. Potassium loss may lead to serious muscular weakness and even paralysis. Desoxycorticosterone is readily absorbed, but ineffective, when given by mouth. It is locally destroyed in the gastro-intestinal tract. It is effective when given by injection, and there are six preparations for use in Addison's disease. Corticosterone or compound B is present in adrenocortical extracts, and with 17-hydroxycorticosterone (hydrocortisone) is the principal steroid obtained by perfusion of the isolated adrenal gland (bovine) with ACTH. Corticosterone causes considerable sodium retention and potassium excretion, and decreased carbohydrate tolerance. It is useful given orally and intramuscularly in cases of Addison's disease. Compound A (11-dehydrocorticosterone) has a similar effect. Compound S (11-desoxy-17-hydrocorticosterone) behaves like desoxycorticosterone. It is of no use in cases of rheumatoid arthritis.

Mönckeberg's Arteriosclerosis.

SAMUEL SILBERT, HEINZ I. LIPPMANN AND ELIAS GORDON (*J.A.M.A.*, April 4, 1953) review the literature and present their views on Mönckeberg's arteriosclerosis. They present the clinical picture as found in 53 patients suffering with this condition, and the clinical notes of five such patients are recorded. They state that the characteristics of the disease are extreme calcification of the arteries of the lower extremities in persons who have no symptoms or signs of impaired circulation. The period of follow-up in these patients ranged from one to fifteen years. The prognosis in Mönckeberg's arteriosclerosis is good, and thrombosis of the extremity arteries does not occur. Manifestations of impaired circulation, such as intermittent claudication, ulceration, or gangrene, are strikingly absent. No treatment of any kind is necessary. Nocturnal cramps occur in one-third of the cases, and can be promptly relieved by calcium lactate given orally. Pathologically, Mönckeberg's arteriosclerosis is characterized by a deposit of calcium in the media of the arteries, believed to be due to calcareous dystrophy of the media ground substance. There is no thickening of the intimal layer, which is the most striking feature of intimal arteriosclerosis, and the blood-vessel lumen is therefore not narrowed. The surface of the intima remains uninjured, and thrombosis does not occur. Radiographically, typical cases show dense uniform calcification, which outlines the major arteries and their branches. The calcium appears to be deposited in transverse lines, giving the appearance of a chain of rings similar to a goose neck. In contrast, calcification in intimal arteriosclerosis is patchy and dispersed, and tends to be deposited in the long axis of the blood vessels.

The Treatment of Migraine, Gout and Heberden's Nodes.

M. B. LEVIN AND B. A. GWYNN (*Am. J. Digest. Dis., April, 1953*) draw attention to a factor which they believe is common in the manifestations of migraine, gout and Heberden's nodes. This factor is stated to be a sensitivity to the higher or readily soluble carbohydrate foods. This is greater in cases of migraine when the readily soluble carbohydrate foods are taken during the latter part of the day, as this tends to build up the blood sugar level in the individual to the height at which precipitation of an attack occurs in the early morning, even though this level is well within the normal range of blood sugar levels. On the other hand, many migraine sufferers can avert and avoid attacks if sufficient water is imbibed within a relatively short time, to flush out the blood sugar and keep it below the attack level. The carbohydrate foods designated must be kept within the individual's tolerance (which is determined by trial and error) at a level low enough to avoid headaches. The authors state that in cases of gout and Heberden's nodes, they could (*a*) precipitate exacerbations or acute attacks of the condition by increasing the intake of higher or readily soluble carbohydrate foods while maintaining normal or less than normal protein intake, and (*b*) clear up the exacerbation or acute attack by reducing the intake of higher or readily soluble carbohydrate foods and by increasing the water intake. They go on to state that there seems to be a definite sugar/nitrogen ratio that is important in preventing the precipitation of attacks of gout and Heberden's nodes. If the sugar/nitrogen ratio is lowered to within the individual's tolerance, this will tend to avert exacerbations or flare-ups of attacks. If this ratio is raised beyond the individual's tolerance, attacks can be precipitated, at times, within forty-eight hours. Excessive sweating, without water replacement beyond the individual's thirst, may also precipitate the attacks. The authors enumerate a suggested dietary regime for the treatment of these conditions.

Myotonia Paradoxa.

JOHN MARSHALL (*J. Neurol., Neurosurg. & Psychiat.*, August, 1952) describes a case of *myotonia paradoxa* in which, when the patient begins to use a muscle or group of muscles, the initial movements are free and powerful; but with continued exercise there appears a dull ache, quickly followed by a progressive loss of power in the muscle accompanied by a tight knotted feeling in its belly and rapidly leading to complete loss of power, the muscle remaining in its shortened position and being hard and board-like. After a few minutes the muscle gradually relaxes and power returns. This is in contrast to ordinary myotonia, in which the initial movements are most hampered and the continued use of the muscle relieves the myotonia. He discusses the effect of repeated testing, temperature, ischæmia and various drugs on the development of the myotonia.

Familial Cretinism.

DOUGLAS HUBBLE (*Lancet, June 6*, 1953) describes a family of four hypothyroid siblings. In the eldest child, from whom thyroid therapy had been withheld for six months, a moderate-sized goitre developed. In the younger children, in whom thyroid therapy had been inadequate, small soft enlargements of the thyroid gland were present which disappeared when adequate therapy was instituted. Thyroxine was present both in the plasma and in the removed thyroid gland of the eldest child. In the second child considerable thyroid activity was proved by radioactive iodine studies. The author states that this dissociation between the clinical diagnosis (hypothyroidism) and the radioactive iodine diagnosis (hyperthyroidism) has been noted by other workers. In these children it is assumed that the amount of thyroxine formed must be inadequate for their needs. It is suggested that the clinical records of goitrous cretinism, both endemic and sporadic, often denote a relative and progressive, rather than an absolute, insufficiency of thyroxine. The enlargement of the gland is regarded as an index of the degree of thyroxine inadequacy. The author states that the stage at which these chemical defects in thyroxine formation occur obviously varies in the published cases of goitrous cretinism. In some, as in the cases described in the article, the deficiency may be quantitative and not qualitative.

Papilloedema.

M. CHAMLIN AND L. M. DAVIDOFF (*Arch. Neurol & Psychiat.*, August, 1952) discuss the differential diagnosis of papilloedema with reference to testing the blind spot. They describe the normal blind spot and its variations, the pathogenesis of papilloedema and its effect on the blind spot, and a technique for measuring minimal changes in the normal and abnormal blind spot. They state that some fundus conditions may simulate papilloedema—namely, pseudo-neuritis, hyaline tissues of the optic disk and optic neuritis. The differential diagnosis is discussed. The authors state that careful repeated measurements of the blind spot are a valuable indication of the progress of papilloedema. They point out also that enlargement of the blind spot occurs before any central vision becomes impaired in cases in which loss of vision is likely to occur. This is a diagnostic aid to the neurosurgeon. Papilloedema should be diagnosed only cautiously when the fundus lacks hæmorrhages and intracranial pressure symptoms are absent. Finally, the authors state that, despite all diagnostic criteria, conditions occur in which papilloedema cannot be differentiated on ocular studies alone, and other diagnostic aids must be employed.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

LXXX.

THE USE AND ABUSE OF DRUGS.

THE CONCISE OXFORD DICTIONARY defines a drug as a "simple substance used alone, or as an ingredient in medicine"; surely the first words go to show that the Fowler brothers, the authors of this work, were out of touch with modern chemistry. It is said that each edition of a pharmacopœia is prepared with the intention of culling unwanted remedies, and that each new edition emerges larger than ever; some member of the selection committee relies upon every drug threatened with extinction. This means that practitioners all test and try the drugs available, and use them as they think fit; therefore, in this article, much more space and emphasis must be allotted to the abuse, rather than to the use of drugs.

I wonder whether drugs have not acquired an undeservedly bad name? In this country, at any rate, drugs of addiction are used temperately, and there are very few addicts who seek the forbidden drugs unashamedly. But this is not true of other communities, to judge from the spate of literature on the subject from the Continent of Europe, and from Egypt and the Middle East. Perhaps the reason for our relative freedom from this problem is the same as that advanced to account for the dearth of prostitutes in Oxford and Cambridge—namely, so many enthusiastic amateurs; and in the drug world, the enthusiastic amateurs are alcohol, "A.P.C." and phenobarbital.

The three outstanding purposes for which drugs are used are to remove pain or distress, to promote sleep and to prevent seizures. Much as the mediæval writers praised mandragora, it is not clear whether its main use was to exorcise pain or to promote sleep. But, with the introduction of opium, all other narcotics paled into insignificance; prepared in many different ways, it became the mainstay of the hypnotic section of the pharmacopœia, yielding some ground to the bromides only in the middle of the nineteenth century. The superior sedative and analeptic qualities of the bromides were quickly recognized, and their greater safety was not questioned until 1930. Towards the end of the century, hypodermic administration of the opium derivatives, morphine and heroin, came into general use, and many other extracts had their brief period of eminence. Gradually opium has been crowded out of the picture, retaining a place, however, in the relief of diarrhœa, and the barbiturates have ousted the bromides. I wonder how far bromide has fallen from the peak year when four tons were dispensed at the out-patient department of Queen's Square?

I would like to lay emphasis on the fact that, apart from very large doses, morphine has an exhilarating rather than a soporific effect, the subject is calmed and sleep is induced by the removal of pain; this excitant action of morphine is better recognized by the nursing than by the medical profession. The great advantage of morphine over opium is its relative freedom from the complications of vomiting and constipation, particularly the latter. There is no doubt that addicts demand and tolerate heroic doses, up to 50 grains a day in some instances, and it is interesting to note that these doses are never needed by those suffering from protracted pain; one-quarter to one-half of a grain may be required somewhat more often, but the effect on the pain remains reasonably satisfactory; in fact, only the psychopathic addicts require the enormous dosage.

A few people are intolerant of morphine, most of them being doctors and their relatives, or nurses. This may be a provision of Nature to counterbalance the undoubted fact that the majority of addicts are drawn from exactly the same sources. In order to overcome this intolerance a whole host of morphine derivatives have been presented, but only three of these are generally used, "Omnopon", heroin and codeine.

Codeine is freely used in analgesic tablets and cough mixtures. "Omnopon" can sometimes be tolerated by those who are morphine-sensitive; though less effective, it is preferred to heroin, on account of the dangers of addiction to the latter. Many claim that heroin will give relief when no other drug will act, but, in my opinion, it should be used solely in those cases in which there is no ultimate hope of recovery; not only is addiction very facile and extremely intractable, but, in addition, heroin addicts are more degenerate, troublesome and importunate than the victims of other drugs. Fortunately, with pethidine, those genuinely intolerant of morphine can obtain some relief. Though not quite as effective as morphine, it has great value in being soporific as well, and apparently makes very little appeal as a drug of addiction, but the mobile patient may find that it causes some degree of giddiness.

The salicylates have considerable power over pain, but in a somewhat specialized direction. Provided that the pain is of what is called a "rheumatic" nature, or is situated in muscles or joints, then the salicylates are often more effective than morphine, but it is obvious that, in order to make them more universally useful, the manufacturer is driven to add other substances, for example, codeine, pyramidon, phenacetin and caffeine. Used in their pure state, the salicylates have little power to induce sleep.

The barbiturates are as specific for insomnia as morphine is for pain. I wonder how many of the innumerable new preparations the practitioner really tries out? I fancy that he adheres to a few old favourites, such as barbitone, "Nembutal" and phenobarbital, and quickly discards the proprietary combinations of one or more new drugs, or of a new and an old drug. All of these are certified to be as rapid in their action as they are in their excretion; but to the sceptic the main difference seems to lie in their enhanced price, perhaps justified by the coloured cummerbund which adorns their gelatin container.

I would say that the guiding principles of administration are few and clear. For pain, morphine is the prime agent, and it should be given in adequate doses for as short a period as possible, and withdrawn as soon as the need has passed. For those who cannot tolerate morphine, pethidine should be used in preference to "Omnopon", "Dicodid" *et cetera*. For sleep, the barbiturates come into their own, and one cannot over-emphasize the advisability of a single drug of proved worth, for example, barbitone or "Nembutal".

The danger of the composite remedy is that it may contain pyramidon, one of the most active agents in the production of agranulocytosis. This is to be regretted because, given by the oral route, pyramidon is next in efficiency in the relief of pain after morphine and pethidine. Twenty years ago, Dr. Allan Walker found that nearly thirty remedies containing pyramidon were available to the Australian public; its effectiveness lies in combating menstrual and migrainous pain without forcing the sufferer to give up work for the time being, hence the nursing profession have great faith in it.

As with morphine, I would advise boldness in the use of barbiturates, allied to administration for a limited period. The most useless method is to prescribe a small dose, to be left by the bedside and taken only when sleep is evasive. The correct method, especially with apprehensive subjects, is to give a full dose, taken an appropriate time before retiring and to continue this practice for perhaps a week; this is followed by a week of diminished dosage, and then complete withdrawal. This method aims at retraining the individual in the sleep habit and, by making sure that it acts, giving him confidence in his doctor's assurance that the drug is effective; it rapidly throws him back on his own sleeping technique. At the same time great emphasis should be laid on the fact that, in the absence of grave organic disease, loss of sleep causes no physical harm; only the neurotics refuse to believe this.

As no section of the general public, even nursing mothers, has greater experience of lack of sleep than general practitioners, I feel somewhat chary of pressing my views on those who have personal experience to guide them, but refractory insomnia is a perquisite of the psychoneurotic; most of the remainder of humanity respond well to reassurance and any reasonable regime.

Seizures.

With seizures the aim should be to employ the minimum dosage capable of suppressing the attack and to use it with extreme and unvarying regularity once the appropriate regime has been established.

Phenobarbital, "Dilantin" and "Prominal" are the drugs of election, and are frequently effective for years without increase in dosage. "Dilantin" is favoured because it causes less sleepiness than the others, but it has unpleasant side effects, the most notable being painful swollen gums in children, and I have noticed that its action tends to be cumulative in the early stages, though not so later on. There are still practitioners of great eminence who can

produce better results with "Luminal" than with phenobarbital, but all chemists agree that the only difference is in the price. In this context it is noteworthy that medication in cases of epilepsy by effective proprietary remedies is approximately eight times as costly as by pharmacopœial prescriptions, at least in America.

Innumerable examples of the necessity for unvarying medication could be given; every teaching physician has his stock of them, so I will limit myself to one personal experience. On three consecutive Christmas mornings I was called in the small hours to an elderly epileptic in a seizure, before I found out that her personal maid, who laid out the phenobarbital for her mistress, was always given the day off on December 24, and the old lady was too haughty to get it for herself.

Prevention is eagerly sought by those cardiacs who suffer from seizures of paroxysmal nocturnal dyspnœa, even though they have learned of the efficacy of intravenous morphine therapy once the attack is established. May I make a plea for the abandonment of the traditional morphine-strychnine-atropine in this state? It acts, but only because the morphine is able to control the attack as well as suppress the action of the two other drugs, both of which favour a continuation of the seizure. Consequently an unnecessarily large dose may be given, and sleep may be delayed by the ensuing morphine exhilaration. Alcohol in milk may prevent the attacks. Tiny doses of morphine certainly do; even one-twelfth of a grain is frequently sufficient, and is not subject to increase, except on account of the severity of the attacks. "Nembutal" and its allies actually predispose towards an attack by the depth of sleep they induce, and the consequent slowness of rousing from this sleep.

Addiction.

Theoretically the problem of addiction should be controlled by policing the manufacture of unwanted or dangerous drugs, and making those necessary for medical practice available by prescription alone. In an island like Australia very small quantities should escape the vigilance of the customs officers, and judged by the drug literature, our ethical standards are considerably above those of the inhabitants of the great land masses. Can any of these drugs be home made? Obviously alcohol and possibly marihuana can, but morphine, heroin, cocaine and the barbiturates all require a factory. Even under present controls five tons of heroin monthly are imported via each of three harbours into China, and this would suffice for the needs of about 180,000 addicts. If one wonders where such enormous quantities of heroin can be coming from, when, under the Opium Commission, every nation has adopted measures of control, it must be assumed that the numerous small plants in Istamboul and Sofia, specializing in heroin and officially closed by the authorities, are set up and working efficiently in other locations.

Alcohol has been in use since the dawn of civilization, and earlier this century America decided, officially anyway, to do without it. And what a lesson she got, and the whole world as well. Of course she has two land frontiers; but even so, home manufacture supplied large quantities, and the increase in acute alcoholism balanced the drop in the chronic state. Getting drunk on alcohol always has been, and still remains, a very popular pastime, and experience has shown that it has been possible to modify the consumption of alcohol, but impossible to suppress it. People will have their drugs; and this being the case, surely it is better to let them have the less harmful ones, such as phenobarbital, aspirin and tobacco, and prevent as completely as possible the dangerous types, cocaine, heroin, marihuana and mescal? The two borderline ones are alcohol and opium.

Alcohol will be hard to eliminate, as temperance advocates have already discovered; apart from the fact that its consumption is an integral part of every social gathering, the loss in revenue to any government banning its use would at once cause the Budget to be unbalanceable, and the voters would speedily throw the government out. Only America could afford to try, and everyone knows with what result. The price of alcohol is lessening its long-term pathological effects, but these are more than counterbalanced by the short-term results to the drivers of modern vehicles. It may be worth while mentioning at this juncture that I have had two certificated aviators admitted to my wards with *delirium tremens* in the last six years, and one flew his "plane" the day before admission.

An enormous number of people consume opium in one form or another. The fact that Asia leads numerically is said to be due to a religious ban on the use of alcohol, but the sceptics aver that, whilst it has no such property, its reputation as an aphrodisiac is solely responsible. Amongst communities in which athletic exercise is frowned upon as a result of climate or public opinion, the search for a pleasant and effective aphrodisiac must be the main preoccupation of all classes. The amount of misery in the home caused by alcoholic excess is known to a few selected professions, and the opium-eater has nothing like the nuisance value of the alcoholic; yet alcoholics are the first to sneer at and deride the morphinist. Even when the habit is carried to extremes, with the exception of the psychopathic addicts, who are a class apart anyway, the morphinist frequently leads a vigorous, clear-thinking and useful life; but at a certain dose level, his ideas become more brilliant than his execution of them. On the other hand the drunkard rarely contributes much except squabbles to his home life, and his only community service is to boost the inland revenue. A switch to opium would make us a more useful community, but the society papers would have to publish pictures of groups with pipes and syringes instead of the inevitable glass in every hand. Small pupils would replace red noses, but the problem of returning home in a motor vehicle would still have to be faced.

Drug addiction is inevitable in a certain percentage of every community, yet prevention will greatly reduce the number of victims. Seeing that "cure" is almost nonexistent, prevention assumes a vitally important role. The greatest security lies in making the dangerous drugs available by medical prescription alone, and addiction is rampant where they are obtainable by other means. The result, in the English-speaking world, is that addicts can be readily recruited only from the ranks of doctors, dentists, nurses and pharmacists, and in a lesser measure, their immediate relatives. And it is extraordinary what a small proportion of these are actually incapacitated by their addiction.

Moreover, pactically all the "cures" are drawn from this group. The remainder of the "cures" come from those who have been given small doses for a self-terminating complaint, and whose medication has been continued after the illness is over. I think it is most important to emphasize that the real addicts, the slaves of the drug, who break up house and home and ruin themselves and their families to obtain supplies, are almost all psychoneurotics.

I have used the word "cure", but place it in inverted commas, for not only is the relapse rate about 80%, but many of those claimed as undergoing cure are taking other, possibly less dangerous, drugs and usually alcohol as well; and addicts are such unblushing liars, and so cunning at concealing their sources of supply, that "cure" is proven only when unexpected segregation fails to result in the restlessness typical of withdrawal, which commences within a period of twelve hours from the last dose. Of the many descriptions of the ways of addicts, the best I know is in the 1910 edition of Allbutt and Rolleston's "System of Medicine". During this restless period, I have had a patient of each sex escape from hospital and run naked to the nearest hotel, where they were promptly served with drink, despite their lack of attire. Their cunning may be illustrated by the man, incarcerated in a private mental hospital in another State, who borrowed £19 from the matron, of all people, and used it to lay his supply line. My most importunate addict once walked a distance of three miles barefoot and in a state of congestive cardiac failure, to arrive at my house at 6 a.m., and would not go until I gave him a few tablets; as usual, his undercover supplier had refused any more morphine on credit.

Despite the publicity given to it in the "Doctor's Diary" and similar lay Press articles, the diagnosis of addiction is not easy until the client returns a second time, usually extremely promptly, sometimes actually the same day, with the story that the prescription has been mislaid; or the patient may stop, just as he or she is leaving, and say: "By the way, I forgot to ask you for something for my pain." Fortunately, there is an infallible method of clinical diagnosis, that of segregation, but it must be in an institution experienced in the ways of addicts. The above-mentioned restlessness commences at once, and before very long the demands for the drug will begin and rapidly become vociferous. Almost equally diagnostic is the patient who refuses to go into hospital—he has been caught before; perhaps in a few days he relents, and then one can be quite sure that the supply line has been organized.

It is absolutely impossible to make any sort of appeal to the psychopathic addict; an institution with a controlled supply of drug is the only solution. This probably applies to any high-dosage subject, but those of normal mentality should be given the chance of one prolonged attempt at

rehabilitation. With the high-dosage addict, gradual withdrawal should be practised with the substitution of some barbiturate to obviate the insomnia, "Somnifaine" being a useful preparation for this purpose; then rapid withdrawal of the barbiturate should follow, if it can be managed, but the latter half of the withdrawal is the testing time. With the lesser cases, considerable difference of opinion exists over the virtues of sudden *versus* gradual withdrawal, the client always voting for the latter. If the physical condition is good, I believe in the sudden method, but sleep must be secured. Insulin is a good adjuvant, for few are eating well, and some potent stimulus to appetite is necessary.

The above remarks apply to heroin as well as morphine, but the treatment of heroin addiction is made considerably harder by the ease with which, in some communities, it can be obtained illegally, by the fact that it causes far greater mental and moral degradation than morphine, and by the method of administration, efficient absorption being obtained by the use of snuff. Most non-medical addicts begin by this route, but abandon it either because of the destruction of the nasal septum, or because of their financial state; they can get a greater effect by injection, and many use the intravenous technique. As their condition leads them to be careless of asepsis, and as their equipment is usually a fountain pen filler and a needle with a blotting paper adapter, it is not surprising that their veins become occluded, and bacterial endocarditis is a common termination.

These people use a jargon not well known outside drug circles. "Snow" is a term for snuff, which may contain heroin or cocaine. "Coke" or "gramophone" records will lead to the production of cocaine, if mentioned in the right surroundings. The superior intravenous drug-taker refers to himself as a "mainline shooter", whilst the lowly exponent of barbiturates is a "yellow jacket", presumably from the colour of the capsule.

I have no personal experience of those addicted to unusual substances, except one ether drinker, a chemist, who responded at once to segregation from his drug. His addiction was started by a series of operations following a severe bodily injury. However, many returned soldiers report that the American troops were partial to the strange combination of a popular "soft" drink in which 20 or 30 tablets of "A.P.C." had been dissolved for some hours. This mixture induced the rapid production of a state indistinguishable from acute alcoholism. The practice dates back to the prohibition days, and I can only think that it is a caffeine intoxication.

Conclusion.

It is not so long since those who taught therapeutics laid great stress on the danger of drugs in relation to renal disorders, and especially evil was the action of morphine on patients with albumin in their urine. Any drug has a more prolonged action in the uræmic or near-uræmic state, largely because of the slower elimination by the kidneys; but with morphine, a very small percentage is discharged by this route, so that albuminuria *per se* is no bar to drug exhibition. Those of us who administered anæsthetics for prostatic operations thirty years ago will remember how efficient was the premedication, in doses which had very little effect in other disorders, and how little ether had to be used to procure satisfactory anæsthesia. Hyoscine appeared to be especially badly tolerated, and I can recall two cases in which the patient did not reach the operating theatre alive, let alone leave it. But I would say that the commonest morphine risk is not fully appreciated even now—that of its use in myxœdema. The reverse applies to thyrotoxicosis. Here, especially in the crises, morphine should be the sheet anchor, a principle emphasized by the late Dr. S. O. Cowen.

As I said at the beginning of this article, all but the most recently qualified practitioners are well aware of the action and uses of the drugs, and the majority are very expert in their use; so that, in closing, I cannot do more than reiterate my plea for boldness in dosage and brevity in duration, as well as an attempt to do without heroin, though I know that this last suggestion will not meet with universal approval. As our profession provides more addicts than any other group, as well as inadvertently inducting a proportion of the remainder by thoughtless medication, I feel that more attention should be given to this aspect, especially in lectures to undergraduates, than to the details of "cure", once again in inverted commas.

GUY LENDON,
Adelaide.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on June 25, 1953, at the Robert H. Todd Assembly Hall, British Medical Association House, 135 Macquarie Street, Sydney, DR. A. J. MURRAY, the President, in the chair.

Epidemic Diarrhœa.

DR. ALISON K. GARVEN read a paper entitled "The Diagnosis and Treatment of Epidemic Diarrhœa" (see page 447).

DR. D. G. HAMILTON read a paper entitled "Diarrhœa and Vomiting in Children" (see page 450).

DR. JEAN ARMYTAGE said that she had been glad to hear Dr. Garven stress the considerable amount of work involved in the examination of fæces, the result often being "no pathogenic organisms isolated". To understand all was to forgive all, and the clinician should understand that it took time. An immediate microscopic examination could be carried out and the result given in a very short time; it would indicate whether the gastro-enteritis was due to an infective process. Dr. Armytage asked whether they had isolated *Bacterium coli a* at the Royal Alexandra Hosptal for Children and if so, which of the types of Kaufmann OB agglutinating serum Dr. Garven used in the identification of these strains of pathogenic *B. coli*. Finally, Dr. Armytage took Dr. Hamilton to task for using the term "normal saline" instead of "physiological saline", and "one-fifth normal saline" instead of "one-fifth physiological saline", but more particularly for writing it as N/5 saline, which was an accurate chemical solution and contained an entirely different amount of sodium chloride.

DR. S. E. J. ROBERTSON said that he heartily agreed with Dr. Hamilton's remarks on treatment. The tendency was to give affected children sulphonamides without change in diet, and within twenty-four hours the patient was much sicker than he would have been if he had been given nothing more than glucose and saline or plain water. Dr. Robertson said that he went further than Dr. Armytage in what she had said about the term "normal saline"; "isotonic saline" should be the term used, not even "physiological saline". Dr. Robertson then took Dr. Hamilton to task about the use of serum. He thought that most patients could be rehydrated and their shock treated without its use. The danger of serum jaundice was perhaps unlikely, but it still existed.

Dr. Garven, in reply to Dr. Armytage, said that over twelve months earlier they had isolated the organism mentioned from a small ward outbreak (six out of eight children who had gastro-enteritis). It was not looked for as a routine procedure. Dr. Garven said that the type of serum used was the original serum; they had not had any pooled serum.

Dr. Hamilton, in reply to what had been said about normal saline and the use of the terms "physiological saline" and "isotonic saline", said that he had explained at the beginning of his paper that he was just a plain man and used the language of common people. On the use of serum, Dr. Hamilton said that he agreed with Dr. Robertson that there was a risk of serum hepatitis. He hoped that it would be overcome by the use of serum from smaller pools. He hoped that Dr. R. J. Walsh and other hæmatologists would be able to solve the problem. Serum was a useful adjunct to treatment, but in some cases it was not necessary. Its use was indicated when shock was severe; but he agreed that even then the administration of water and salt made a great difference.

Dr. Murray, from the chair, said that the papers had covered the subject so completely that the discussion had accordingly been very short. He thanked the speakers for the work and thought that had gone into the presentation of the papers.

THE AUSTRALIAN SOCIETY OF ALLERGISTS.

ANNUAL MEETING.

THE first annual meeting of the Australian Society of Allergists (British Medical Association) was held at British Medical Association House, 135 Macquarie Street, Sydney, from July 22 to 24, 1953. The following officers were

elected to the executive: *President,* Dr. Charles Sutherland (Melbourne); *President-elect,* Dr. Robert Steel (Sydney); *Secretary and Treasurer,* Dr. Russell Donald (Melbourne); *Committee Members,* Dr. P. Ward Farmer (Victoria), Dr. Bernard Riley (New South Wales), Dr. G. Stening (New South Wales), Dr. C. Piper (South Australia).

On Wednesday, July 22, the meeting was opened by Dr. C. Sutherland, who presented his presidential address.

Dr. R. Donald then opened a discussion on fees for allergic investigation and treatment.

Dr. C. Piper read a paper entitled "A Case for the Freer Availability of Cortisone, and its Availability under the Pharmaceutical Benefits Act for Cases of Intractable Asthma".

It was decided to hold the next annual meeting in Melbourne in the last week of May, 1954.

On Thursday, July 23, both afternoon and evening sessions were held and the following papers were read: "The Nasal Aspect in the Treatment of Allergic Conditions", Dr. Gerald Doyle; "Ciliary Action', Dr. Russell Donald; "Urticaria", Dr. R. S. Steel; "Atopic Eczema", Dr. P. Ward Farmer; "The South-west Wind", Dr. C. Sands; "The Influence of Locality on Bacteria-sensitive Children", Dr. P. Waugh; "The Significance of Allergy in General Medicine", Dr. C. Sutherland.

Visits were made by members to the allergy clinics at the Royal Prince Alfred Hospital, the Royal North Shore Hospital, the Eastern Suburbs Hospital, and the New South Wales Community Hospital.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held at the Children's Hospital, Melbourne, on April 8, 1953.

Acute Meningococcal Septicæmia.

DR. A. W. VENABLES said that systemic meningococcal infection began with blood-stream involvement. The septicæmic phase might be mild and pass unnoticed, being recognized only in retrospect after a diagnosis of meningitis had been made. Sometimes the presence of residual petechiæ or a history of a fleeting erythematous rash was the sole diagnostic feature. In contrast, the septicæmia could produce a fulminating illness with circulatory failure overshadowing any meningitis which might have developed.

Meningococcal septicæmia was not an uncommon disease. In the year 1951, 48 children suffering from meningococcal infection with presenting features attributable to their septicæmic phase were seen at the Children's Hospital. Four of those children were either dead on arrival or died before treatment could be started. Nine others, making a total of 13 in all, died despite treatment. In 1950 there were 39 cases with 11 deaths. One patient in the 1951 group was a boy, aged six years, who had already been in hospital for four days with a fractured femur, but all the others presented with meningococcal infection. In this representative group, the ages varied from four months to ten years, most of the patients being infants, but there seemed to be no correlation between age and the severity of the illness. In about one-third of the patients there was evidence of a preceding mild upper respiratory tract infection. Symptoms attributable to septicæmia were of relatively short duration, usually less than twenty-four hours, and at the Melbourne Children's Hospital chronic meningococcal septicæmia seemed to be quite uncommon.

Dr. Venables classified the symptoms into three main groups: firstly, non-specific general symptoms, including fever, irritability, anorexia, vomiting and convulsions; secondly, a rash, which was almost always present; thirdly, features due to septicæmic circulatory failure, which were frequently found.

The rash was seldom the initial feature, but clinical recognition of the disease largely depended on it. It could vary from a few papular or macular erythematous lesions to the better known gross purpura which usually accompanied a fulminating infection. The erythematous rashes presented most difficulties. In most cases, however, a careful search would reveal a few petechiæ, in the skin, in the conjunctiva or in the oral mucous membranes.

The association of a doubtful rash and circulatory failure should make recognition much easier. Any rash in an acute illness of obscure origin, particularly if there were any petechiæ, should be regarded with suspicion. The purpuric elements of a true meningococcal rash would often increase during the first few hours of treatment because of increased extravasation from damaged capillaries. On the second or third day an apparently new erythematous rash would sometimes be observed, but this was the result of inflammatory erythema related to the original petechiæ.

Dr. Venables said that there was one well-defined clinical entity sometimes confused with meningococcal infection, which he called "fleabite purpura"—a rash consisting of fine reddish petechial spots, varying in age, but very uniform in size, often thickly spread around the waist and neck and on the shoulders. It was quite common in hospital casualty practice, but on occasions one had to be cautious in diagnosing it.

Circulatory failure manifested itself in these patients by tachycardia and poor pulse volume, hypotension, dyspnœa and cyanosis of the lips and extremities. The extent of these features permitted classification of its severity from mild to severe failure. In the most severe cases there was coarse stagnant mottling of the skin. Circulatory failure was the cause of death in acute meningococcal septicæmia, and its presence completely changed the prognosis. The nine deaths occurring among the 44 treated patients in the 1951 series were all among those 31 patients with circulatory failure. There were no deaths among the 13 children whose diagnosis was proven by blood culture, and who had no circulatory failure. Circulatory failure often became more obvious while treatment was being instituted. On occasions it had developed in children after admission to the ward. One example was a boy, aged five years, with a history of a "cold" for one week. Twelve hours before admission he had vomited, and four hours later he had developed a rash on his abdomen, which on admission was sparse and macular with a few petechiæ. Routine chemotherapy was commenced, but no intravenous fluid therapy was given. One hour later, he became suddenly cyanosed with an impalpable pulse and an unrecordable blood pressure, and the rash became more profuse and hæmorrhagic. He responded well to intravenous serum therapy and subsequently made a complete recovery. The result of blood culture was positive for meningococci.

Dr. Venables said that this experience supported the need for commencement of saline infusions in even mild cases, as serum could, if necessary, be given easily and rapidly. Convulsions which occurred during the course of the illness would aggravate and at times initiate circulatory failure. However, convulsions were usually secondary to coexisting established purulent meningitis; although in some cases, described as the encephalitic group by Banks, there was no significant meningitis. The other factor which could produce circulatory failure in meningococcal infection was dehydration due to vomiting. This commonly occurred in cases of established meningitis, and could lead to an appearance superficially resembling severe septicæmia, although the distinction could be made fairly easily. The prognosis was that of meningococcal meningitis, not that of septicæmia.

Purulent cerebro-spinal fluid was found at some stage in about one-third of the children who presented with symptoms attributable to septicæmia. However, it was unusual to find significant meningitis in those diagnosed in the septicæmic phase without circulatory failure (one of thirteen in the 1951 series). In some cases, the cerebro-spinal fluid was macroscopically normal on admission, but became turbid subsequently. In contrast to the turbid admission specimens, these later ones were invariably sterile. Treatment controlled the infection, but was unable to halt the meningeal reaction to it. In the cerebro-spinal fluid specimens which were macroscopically normal, there were usually increased numbers of polymorphonuclear leucocytes, from two to 200 per cubic millimetre, but mostly less than 30 per cubic millimetre. Protein levels were normal. Of 37 consecutive cerebro-spinal fluid specimens examined in cases of proven meningococcal septicæmia, only two could be regarded as normal. The remainder were either frankly purulent or showed this moderate polymorphonuclear reaction. This change in the cerebro-spinal fluid was the most valuable immediate aid to diagnosis in a doubtful case. Petechial biopsy with smear and culture was useful in confirming diagnoses which were clinically fairly definite. When the diagnosis was doubtful, cerebro-spinal fluid examination was the more valuable investigation.

Absolute diagnosis rested on the recovery of meningococci. Positive findings from blood culture should be

obtained from a high percentage of patients. In the last series 35 out of 44 children had provided positive blood culture findings. In some, the degree of circulatory failure would make blood taking difficult. In small babies, it was quicker to take blood immediately from the sagittal sinus than from the femoral vein, but if any difficulty was experienced the attempt should be abandoned. Contamination of blood cultures and previous chemotherapy interfered with this method of confirmation. Meningococcal infection in some cases would be proven by cerebro-spinal fluid culture, and in others by petechial biopsy. Peripheral blood smears as suggested by some writers in the United States of America had not been used.

The aim of treatment was to control circulatory failure as rapidly as possible, and at the same time to suppress the infection. After rapid preliminary assessment, the procedure at the Children's Hospital was to set up an intravenous serum infusion apparatus when circulatory failure was present. Blood was then taken for culture, immediately prior to the administration of penicillin 100,000 units and sulphadimidine 1·0 gramme into the infusion tubing. Lumbar puncture was performed when convenient. Routine intrathecal administration of penicillin was not indicated. Chemotherapy was continued in appropriate dosage and by a suitable route for approximately one week; the exact period depended on progress. It was impossible to predict the amount of serum necessary to effect improvement of the circulation. It was very difficult to define the transition from the original septicæmic circulatory failure to a state of overloading with central cardiac failure, and undoubtedly on occasions too much serum had been given. Dr. Venables said that, at present, he preferred to limit the amount of serum rather than to persist with rapid rates of infusion indefinitely because of apparent failure to respond. The paradox of normal blood pressure and impalpable peripheral pulses had been observed in some patients, and many factors contributing to that type of circulatory failure remained unknown.

In the severely ill patients recovery was notoriously unpredictable despite treatment. Those who died usually had severe circulatory failure on admission, and death occurred within twenty-four hours of commencement of treatment, following either a complete failure to respond, or else secondary deterioration following an initially unsatisfactory response. There was no correlation between age and survival from circulatory failure, contrary to the expressed opinions of some writers. In 1951, 11 children, aged less than twelve months, with circulatory failure survived. A number of survivors had severe failure with cyanosis. Once circulatory failure was completely controlled, there was usually a steady improvement, and survival beyond twenty-four hours usually guaranteed ultimate recovery. The most common late complication was sloughing of ecchymotic areas, which might be extensive and deep and leave large scars; and even gangrene of extremities might occur, necessitating amputation.

During the acute phase, there might be complications due to purulent meningitis. A form of paralytic ileus with gross distension and bleeding into the bowel was common in severely ill patients. Most children with the encephalitic form of the disease and obvious cerebral involvement but with mild meningitis died, but others might survive with gross cerebral damage.

At necropsy, suprarenal destruction by hæmorrhage was by no means always present in fatal cases. For that reason the pathological term Waterhouse-Friderichsen syndrome had been deliberately omitted and should be replaced by the more accurate term "fulminating meningococcal septicæmia".

Dr. Venables then briefly referred to the use of cortisone. He said that frequent reports of cases of recovery in fulminating meningococcal septicæmia attributed to cortisone were being published. During 1951 at the Children's Hospital 17 children with meningococcal septicæmia and circulatory failure were treated with cortisone, in amounts varying between 75 milligrammes and 325 milligrammes spread over periods of up to seventy-two hours, and it appeared that the course of the illness was unaltered, remaining quite unpredictable. Although one could not provide statistical evidence that cortisone had no value, its effect was certainly not great.

In summary, meningococcal septicæmia was a common disease, confusing in its early stages. There were two distinct groups of patients: those without evidence of circulatory failure, and those with circulatory failure. The first group uniformly recovered unless progression to the second group occurred. The mortality in the second group was nearly 30% despite treatment. The optimum treatment of the severe forms of circulatory failure was as yet an unsolved problem. The mortality might be reduced by more effective and safer techniques in resuscitation, but treatment would often be considerably aided by earlier recognition and consequent earlier presentation to hospital.

Perusal of case histories would show that failure to recognize the significance of meningococcal rashes when there was still little or no circulatory failure was still too common.

The Pathology of Acute Meningococcal Septicæmia.

DR. J. W. PERRY stated that in a period of five years at the Children's Hospital, Melbourne, 43 autopsies had been performed on children dead of acute fulminating meningococcal septicæmia. Text-books and literature on the subject described this disease as an intense overwhelming bacterial infection resulting in gross vascular damage with thromboses or hæmorrhage or both. He agreed with the previous speaker that the term "acute fulminating meningococcal septicæmia" was more suitable for the group as a whole than the name Waterhouse-Friderichsen syndrome. However, diffuse vascular damage with thromboses or hæmorrhages or both as a manifestation of the post-mortem findings was not always present. Microscopic lesions consisting of extravasation of red cells or of tiny intravascular thromboses were sometimes difficult to assess, and frequently no evidence of microscopic change was present. Those observers who depended on the microscope for the determination of the presence of hæmorrhage into the adrenal glands often left their findings open to conjecture. Of 43 subjects on whom a post-mortem examination had been performed in the Children's Hospital, Melbourne, 21 had bilateral macroscopic hæmorrhages into the adrenal glands.

Whilst the majority of children had changes in the respiratory tract amounting to pulmonary congestion or bronchopneumonia, a careful assessment of the heart, liver and kidney, made both macroscopically and microscopically, revealed that in 28 children the heart showed no detectable abnormality, in 35 children the liver was within normal limits and in 41 of the 43 children no obvious pathological change was detected in the kidney.

Of 21 children from whom cerebro-spinal fluid was examined early in the illness, 11 had changes in the cerebro-spinal fluid, but only two of the 11 had sufficient change for their condition to be considered purulent meningitis. The children with purulent meningitis might be considered as belonging to the group suffering from cerebro-spinal spotted fever of very severe nature which was at times indistinguishable from the acute fulminating septicæmia group. Of 21 patients examined 10 had a positive blood culture result; and whilst that figure was low, it was probably because some of the patients had received antibiotic or sulphonamide therapy before admission. Dr. Perry stated that 20 of the children had been examined by removal of a small portion of skin from a hæmorrhagic area. The dermis had been applied to the surface of a microscopic slide and Gram staining carried out on the resulting smear. In 19 of the 20 cases organisms morphologically indistinguishable from *Neisseria meningitidis* were seen in the smear. Some of the smears had been shown to Dr. Phyllis Rountree, of the Royal Prince Alfred Hospital, Sydney, and she had agreed that the organisms were indistinguishable from *Neisseria meningitidis*. On several occasions a positive culture result had been obtained from the excised skin lesion. That observation testified to the ubiquity of the organisms in the body in a case of acute meningococcal septicæmia; and it seemed certain that the explanation of sudden death was not related solely to multiple tiny extravasations and thromboses in small vessels, but was, at least in part, due to the presence of an intense shower of bacteria in the systemic circulation and the effects produced therefrom. There was sufficient evidence from experimental work on animals to throw grave doubt on the significance of bilateral adrenal hæmorrhage as a contributor to the early death of such patients. In addition, in only approximately half of the subjects examined at autopsy was adrenal hæmorrhage found. It was possible to say only that the disease was one in which bacteria were disseminated throughout the body in vast numbers. Their presence was indicated by examination of skin smears and by the detection of them in the blood-stream and in the cerebro-spinal fluid. Changes were seen in various organs in the body similar to those described in the text-books and in the literature, but Dr. Perry said that in his experience they were not as uniformly present as suggested. In spite of the emphasis he laid on the presence of bacteria widely disseminated in the body, it was his opinion that if asked what was the cause of death in cases of acute fulminating meningococcal septicæmia, he would still have to reply: "I do not know."

DR. K. M. BOWDEN said that in 25 of 30 subjects examined at the City Morgue death was due to meningococcal septicæmia. A reduction in mortality rate could best be obtained by recognition of the disease in the early stages. Students should be taught the urgency of this, so that as practitioners they could refer affected persons to hospitals before circulatory failure had developed.

DR. W. B. MACDONALD said that in over 20 consecutive petechial biopsy smears meningococci were demonstrated, but he agreed with Dr. Venables that the procedure was seldom necessary to establish a diagnosis. In one case of acute thrombocytopenic purpura and peripheral circulatory failure, a petechial biopsy smear examination failed to reveal meningococci, but the patient was still treated as suffering from meningococcal septicæmia.

DR. H. MCLORINAN said that intravenous infusion therapy for the circulatory failure of meningococcal septicæmia was sometimes too vigorous, and suggested that more conservative supportive measures might at times be less hazardous.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

THE CLUB SYSTEM.[1]

Ballarat,
October, 1871.

To the Editor of *The Australian Medical Gazette.*

Sir,

The custom of those semi-charity benefit societies holding out inducements—which never can be realized—to medical men to take them is cruel in the extreme. Not a few of the Society's patients are people of wealth and their demands on an unfortunate medical man's time very far exceed the requirements of the poor man. It is quite absurd for a medical man even to think of making a home where all the practice is semi-charity—why, his whole income will barely keep his horse. The members of the benefit societies promise accouchements but rarely give them except when required to screen some midwife from justly deserved punishment. As to private practice it is among those who are too poor to form a society or even pay a doctor: so that he has to wander from place to place for practice or starve. But when a Vice Chancellor of a University acutally engages in club practice it is useless to complain.

JUNIOR.

Correspondence.

ACUTE INFECTIONS OF THE FINGERS AND HAND.

SIR: I would like to make a few remarks on the interesting article in the journal of August 1 on "Acute Infections of the Fingers and Hand", by T. J. Claffey and Noel C. Newton.

1. Apparently Dr. Claffey and Dr. Newton have not seen Kanavel's very interesting film on the hand that was made some years ago. This is a most instructive and very useful film and is used in teaching students each year various points about the anatomy of the hand. They also do not appear to have witnessed the very excellent demonstration of the hand by Mr. Hughes Jones, which was shown some years ago when Professor Wood Jones was Professor of Anatomy at Melbourne University.

2. One agrees with most of what is written about pulp abscesses, apical abscesses, web abscesses *et cetera*, but it should be noted that the writers do not appear to have had much experience with tendon sheath infections and space infections. One can understand that in a large metropolitan hospital there will not be many of these infections now that infections of the hand are receiving so much attention.

3. In a large State like Queensland there are, on occasions, people who suffer from tendon sheath infections and space infections, who have not had the opportunity of receiving treatment in expert hands and who come so late in the course of their disability that they have had no antibiotics and the infections are well established. I like the statement by Dr. Barraclough, a prominent Victorian surgeon, who said that "when the infected finger keeps a patient awake at night it is time for the finger to be opened".

4. No doubt in these days, infections of the hand are treated much better and much earlier than before, but it is a mistake to belittle the work of such people as Kanavel, Iselin, Bunnell *et cetera*. In very many instances one has had very great help from the teachings of these men.

5. One can agree with the principles of treatment laid down by the authors, and the very fine set of instruments as recommended should be used are strongly recommended for all hospitals. Unfortunately I fear that in some public hospitals this important work is left to the care of inexperienced resident medical officers working with insufficient tools of not very good quality.

Yours, etc.,
E. S. MEYERS.

The University of Queensland Medical School,
Herston Road,
Fortitude Valley, N.1,
Brisbane.
August 31, 1953.

FLUORINE AND DENTAL CARIES.

SIR: Mr. Noel D. Martin's comments on our paper (M. J. AUSTRALIA, July 11, 1953) are interesting, but unfortunately not all of them are to the point. He states that it would "appear" from our paper "that the toxic effects of fluorine are so serious as to make artificial fluoridation detrimental to the public health". This interpretation of our discussion on the toxicity of fluorine indicates that Mr. Martin has not followed our line of argument. Our comments were to the effect that fluorine is a toxic agent with possible long-range systemic effects, that there must be very serious deliberation before determining on its use for fluoridation of water, and that meticulous control is necessary if the technique is used.

Mr. Martin's comment concerning Dr. R. Weaver's work on children from North and South Shields indicates that again he has not appreciated the point in question, namely, that Dr. Weaver's figures give comprehensive results for adolescents who have been drinking natural fluorinated water since early childhood, and over a longer period than that at present furnished by any artificial fluoridation experiment in the United States of America.

Mr. Martin quotes the American Dental Association Newsletter of July 15, 1953, which stated that the British Government White Paper issued at the beginning of July this year "recommended fluoridation for England". Such a generalization is misleading. The editorial entitled "Fluoridation of Water" in the *British Medical Journal*, July 11, 1953, discussed the findings of this White Paper and stated that the British Government mission which recently studied fluoridation in the United States of America "advises in the first instance the addition of fluorine in water supplies in some selected communities which should be regarded as study centres to observe the effectiveness of our true conditions of diet and caries experience. Research should also be carried out in areas where fluorine occurs naturally and in higher concentrations than that stated for artificial addition, where the general health could be studied and investigations carried out into bone development and disease, and diseases of the kidney in particular, so that no question remains unanswered". This statement can hardly be construed as an ad-hoc recommendation of fluoridation for England.

Further quotations from the editorial of the *British Medical Journal* already mentioned are as follows: "It may give rise to some surprise that in the United States, 'where by 1951 fluoridation of water supplies had become a fairly common practice', a Select Committee of the House of Representatives conducted a public inquiry into the safety and efficacy of fluoridation and concluded 'that a sufficient number of unanswered questions concerning the safety of this program exists to warrant a conservative attitude'. This conservative attitude is mirrored in the (British) mission's recommendations."

[1] From the original in the Mitchell Library, Sydney.

"The amount of reduction in dental caries caused by the presence of fluorine in the drinking water should be viewed in perspective. Comparative studies show that much the greatest change in the incidence of dental caries is associated with alteration of diet. Even the reduction in dental caries experienced by many communities under wartime conditions was greater than could be expected from drinking fluorine-containing water. And the increase in dental caries observed since the war, an increase that seems to be continuing even now, would scarcely be reversed by the fluoridation of drinking water."

Yours, etc.,
ARTHUR AMIES.
PAUL PINCUS.

193 Spring Street,
Melbourne, C.1,
September 4, 1953.

WATTLE AND PENICILLIN.

SIR: I would like to avail myself of a small space in your journal in the hope that one of its many readers may provide an answer to a question which to date has evaded solution. My problem is one of smells. I wonder if any reader has noticed how much alike is the smell, or should I say perfume, of wattle and the smell of penicillin. Does the characteristic smell of penicillin have its origin in its active principle, and if so, does the similarity of smell of wattle blossom suggest that it may contain the active principle of penicillin?

Yours, etc.,
J. B. NALLY.

George Town,
Tasmania,
September 5, 1953.

Obituary.

WILLIAM RAY.

WE are indebted to Dr. E. F. Gartrell for the following appreciation of the late Dr. William Ray.

As William Ray, known to his colleagues and friends as Bill, practised in Adelaide until his retirement, it is fitting that we should record some of his activities and achievements.

I had the privilege of learning from him when I was a student, working in association with him on the honorary staff at the Royal Adelaide Hospital and in the army, and finally of attending him when ill-health brought about his retirement. These associations gave me ample opportunity of observing and assessing him as a man, as a scientist and as a physician.

As a man he was of a kindly disposition. As a physician he was astute and capable, but it was really as a scientist that his potentialities were greatest. I am not alone in thinking that, useful though he was in many spheres, he would have attained much greater renown in the realms of research and science.

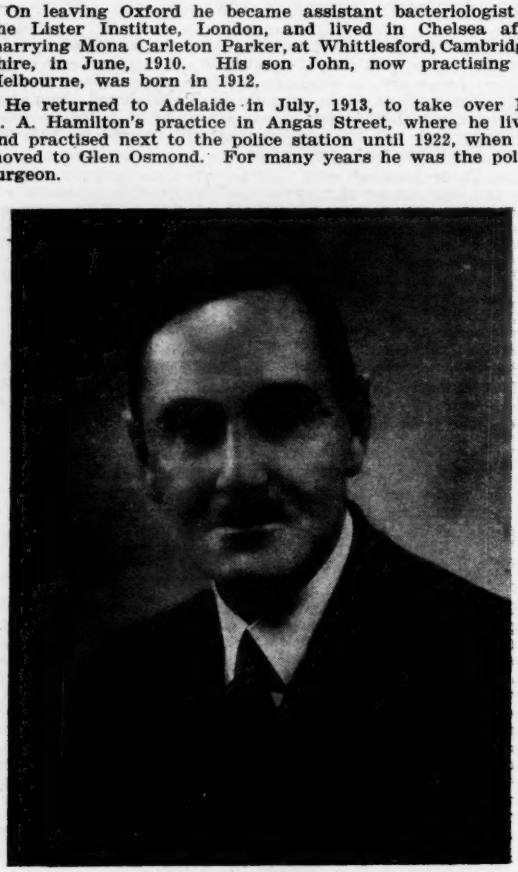
William Ray was born in Manchester, England, on June 19, 1883, being the youngest of the five children of Mr. and Mrs. William Ray. He came to Australia as a child when his father was appointed Chief Engineer of the South Australian Gas Company. He was educated at Queen's School and Saint Peter's College, where he won the Wyatt Scholarship in Chemistry. During his medical course at the University of Adelaide he topped every year and was awarded each year's scholarship, including the Davies Thomas Scholarships and Everard Prize. He was granted the Rhodes Scholarship in 1905 and proceeded to Magdalen College, Oxford, where he worked in the pathology department with Professor Georges Dreyer and Dr. (later Professor) Ainlie Walker.

His main interest was research in blood volumes of warm-blooded animals and various aspects of immunity. He was the first to evolve the formula correlating blood volume and surface area in warm-blooded animals. In recognition of his research work he was granted the degree of B.Sc. (Oxon.). In 1909 he was awarded the Philip Walker Studentship in Pathology enabling him to have a further three years' study at Oxford. This scholarship in pathological research was available to applicants throughout the world.

During his stay at Oxford he worked at the Radcliffe Infirmary with Sir William Osler, who wished him to take the chair of pathology at Toronto, but as he wished to come back to Australia he refused. Osler thought enough of him to assure him that he would support his application for any suitable appointment.

On leaving Oxford he became assistant bacteriologist at the Lister Institute, London, and lived in Chelsea after marrying Mona Carleton Parker, at Whittlesford, Cambridgeshire, in June, 1910. His son John, now practising in Melbourne, was born in 1912.

He returned to Adelaide in July, 1913, to take over Dr. A. A. Hamilton's practice in Angas Street, where he lived and practised next to the police station until 1922, when he moved to Glen Osmond. For many years he was the police surgeon.



During World War I the Government held him to a number of jobs which he had contracted to do. At this time he did a tremendous amount of honorary work as pathologist to the Adelaide Children's Hospital, in performing post-mortem examinations at the Royal Adelaide Hospital, as assistant physician there and visiting physician to Kalyra Sanatorium, and in looking after the patients at the infectious block during the meningitis epidemic. At this time he often did not get home until 2 or 3 a.m.

He was appointed an honorary physician at the Royal Adelaide Hospital on August 5, 1921, and retired on August 4, 1941, after serving the full term of twenty years; after that he was appointed a consulting physician to the hospital.

He was the first radiologist at the Royal Adelaide Hospital, where he was instrumental in starting the X-ray and electrocardiograph departments. He lectured in applied physiology, clinical medicine and systematic medicine, becoming eventually Director of Medical Studies.

For three years he was Dean of the Faculty of Medicine at the University of Adelaide, and he was also a member of the Advisory Committee of the Royal Adelaide Hospital, the Council of the University and the Council of Saint Mark's College. He was a most efficient chairman at the meetings of the honorary staff at the hospital.

During the Second World War he did full-time duty and served as a senior physician at 105 Australian General Hospital with the rank of major.

In practice his main interest was in medicine, but he also displayed no mean skill as a surgeon. His desire for achievement was far greater than his love for routine work.

This led to various adventures, such as cystoscopy and even the removal of a peanut through a bronchoscope, but, having attained some degree of efficiency, he was then apt to follow another path into unexplored territory. With the aid of two beer bottles he performed the first artificial pneumothorax in South Australia.

His versatility was exhibited equally well in sport. At one time, as a cadet, he held the record with 13 consecutive bulls at 500 yards. He rowed in the second eight at Magdalen. He played lacrosse at the University, and some cricket. He also enjoyed a game of golf, but when he wanted relaxation he used to retire to his yacht *Soliloquy*. He took great pleasure in a game of billiards at the old University Club, especially with his friend, the late Dr. E. Harold Davies.

It must have been very galling for one so gifted to be prematurely immobilized by the onset of *paralysis agitans*. During this latter period Bill was happily cared for by his devoted wife, who shared with him an intense interest in good literature; this in some measure replaced the attractions of the activities of yesterday.

As John Ray and his sister Jocelyn were living in Melbourne, they persuaded their parents to emigrate there in August, 1949. In April, 1953, Mrs. Ray died, and before long her husband's eventful life also came to an end.

So we bid farewell to a most gifted colleague who will be long remembered by his many friends.

Research.

THE UNIVERSITY OF SYDNEY.

Medical Research Fellowships.

APPLICATIONS are invited for the following medical research fellowships for the year 1954: the Reginald Maney Lake and Amy Laura Bonamy Scholarship (pathological research work); the Anderson Stuart Memorial Research Fellowship (medical research) and the Marion Clare Reddall Scholarship (research work in medical science), which may be awarded in conjunction (one fellowship only is available in 1954); the Liston Wilson Fellowship (research in spastic paralysis or some allied subject); the Sister Sanders Scholarship (research work in the prevention of diseases of children).

The annual value of each of these fellowships and scholarships will be £800 *per annum plus* cost-of-living allowance of £252 for males and £191 for females (as at August 1, 1953) for suitable candidates. Fellowships are renewable for a second and, in certain circumstances, a third year. Regulations for the fellowships may be seen in the 1953 Calendar of the University of Sydney (pages 433 to 436).

The fellowships for 1954 will be awarded in December, 1953, and will fall due on January 1, 1954. Applications, which close on November 30, 1953, should be made to the Registrar. Application forms may be obtained from the Registrar's office.

Notice.

THE STAWELL ORATION.

THE twentieth Sir Richard Stawell Oration, entitled "Tomorrow's Engineering Development in Victoria", will be delivered by Major-General Sir Clive Steele on Wednesday, October 7, 1953, at the Royal Australasian College of Surgeons, Spring Street, Melbourne. All members of the Victorian Branch of the British Medical Association and their wives are invited to attend the oratoin.

Corrigendum.

IN the issue of August 22, 1953, a mistake has been made in an item under the heading "Medical Appointments". It was stated that Dr. C. O. Cramp had been appointed a medical officer in the School Medical Service, Department of Public Health, New South Wales. This should read: "Dr. C. O. Cramp has been appointed a medical officer in the Department of Public Health, New South Wales."

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED AUGUST 15, 1953.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	3(3)	3(3)	..	..	..	..	..	..	6
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	1	..	1
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	5(5)	1(1)	14(11)	..	..	..	1	..	21
Diphtheria	12(7)	2	4(3)	..	6(6)	2(2)	..	..	26
Dysentery (Bacillary)	..	..	1(1)	..	..	..	..	..	1
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	..	14(5)	..	..	11(5)	..	1	..	26
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	4	..	..	..	4
Leptospirosis	..	..	..	..	..	..	..	..	..
Malaria	..	..	1	..	3(3)	..	1	..	5
Meningococcal Infection	5(3)	5(1)	..	1	1(1)	1(1)	..	..	13
Ophthalmia	..	..	..	..	2	..	..	..	2
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	8(4)	..	..	2(2)	1	..	..	..	11
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	24(19)	2(2)	..	25(25)	..	..	..	51
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	20(17)	35(23)	2(1)	3	1(1)	3	..	..	64
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	2(1)	..	..	..	..	..	2
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	39(34)	9(1)	9(3)	15(11)	2(2)	7(3)	2	1	84
Typhoid Fever	7(4)	3(3)	2(2)	..	..	..	..	..	12
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Australian Medical Board Proceedings.

QUEENSLAND.

THE following have been registered, pursuant to the provisions of *The Medical Acts*, 1939-1948, of Queensland, as duly qualified medical practitioners: Scott-Young, Norman Reginald, M.B., B.S., 1941 (Univ. Sydney), F.R.C.S. (England), 1951; O'Leary, Timothy Joseph, M.B., B.Ch., N.U. (Ireland), 1949; Morrison, Ion Craig, M.B., B.S., 1942 (Univ. Sydney); Rogers, Shadwell Keen, M.B., B.S., 1952 (Univ. London); Hardy, Harry Taylor, M.B., Ch.B., 1938 (Univ. Leeds), L.R.C.P., L.R.C.S. (Edinburgh), L.R.F.P. & S. (Glasgow), 1939, M.D., 1946 (Univ. Leeds); Feather, Robert Hartley, M.B., B.S., 1951 (Univ. Sydney).

The following additional qualifications have been registered: Lilley, Charles Mitford, F.R.A.C.S., 1931; Gallagher, Michael Joseph (junior), F.R.A.C.S., 1953.

TASMANIA.

THE following have been registered, pursuant to the provisions of the *Medical Act*, 1918, as duly qualified medical practitioners: Langman, Claude, L.R.C.P. and S. (Edinburgh), 1950, L.R.F.P.S. (Glasgow), 1950; Madigan, James Patrick, M.B., B.S., 1945 (Univ. Melbourne), M.D., 1950 (Univ. Melbourne), M.R.A.C.P., 1950.

Medical Appointments.

Dr. K. P. Rush, pursuant to the provisions of Section 5 of the *Cancer Institute Act*, 1948, has been appointed a member of the Cancer Institute Board of Victoria, on the nomination of Saint Vincent's Hospital, for the period to *March 28, 1955.*

Dr. F. M. G. Prendergast has been appointed psychiatrist to the Mental Hygiene Branch, Department of Health, Victoria, pursuant to the provisions of Section 18 (2) of the *Mental Hygiene Authority Act*, 1950.

Dr. J. F. J. Cade has been appointed superintendent of the receiving house, "Pleasant View", Preston, Victoria, pursuant to the provisions of Section 41 of the *Mental Hygiene Act*, 1928.

Dr. H. C. Stone has been appointed superintendent of the Mental Hospital, Larundel, Victoria, pursuant to the provisions of Section 35 of the *Mental Hygiene Act*, 1928.

Dr. J. F. Williams has been appointed public vaccinator, East Riding, Shire of Flinders, Victoria.

Dr. C. G. S. Hosking has been appointed public vaccinator, Shire of Yea, Victoria.

Dr. R. J. Fleming has been appointed public vaccinator, Shire of South Gippsland, Victoria.

Professor J. B. Cleland and Professor A. A. Abbie have been appointed members of the Fauna and Flora Board of South Australia.

Dr. J. J. Stumm has been appointed Government Medical Officer at Pomona, Queensland.

Dr. R. A. Burston has been appointed honorary clinical assistant to the medical out-patient department of the Royal Adelaide Hospital.

Dr. A. J. Clarkson has been appointed medical officer at Port Lincoln Hospital, South Australia.

Dr. M. F. Dowell has been appointed government medical officer at Hughenden, Queensland.

Dr. W. A. Bowden, Dr. S. T. Savage and Dr. D. E. Hoile have been appointed Quarantine Officers at Fremantle, Western Australia, Geraldton, Western Australia, and Port Adelaide, South Australia, respectively, under the provisions of the *Quarantine Act* 1908-1950.

Dr. P. J. Blaxland has been appointed on probation as a medical officer of the Commonwealth Department of Health, Darwin, Northern Territory, under Section 47 of the *Public Service Act*.

The appointments of Dr. H. O. Lancaster as medical officer of the Commonwealth Department of Health for New South Wales and of Dr. J. J. Elphinstone as medical officer for South Australia have been confirmed under Section 47 of the *Public Service Act* as on and from August 12, 1952, and November 28, 1952, respectively.

Dr. A. S. Ellis has been appointed psychiatrist, Mental Hygiene Branch, Department of Health, Victoria.

Dr. B. R. Grove has been appointed public vaccinator to the Shire of Donald, Victoria.

Dr. Wallace Hugh Denehy has been appointed as a Quarantine Officer, Melbourne, pursuant to the provisions of the *Quarantine Act*, 1908-1950.

Deaths.

THE following deaths have been announced:

GAY.—Keith Roy Gay, on August 30, 1953, at Brunswick, Victoria.

NIXON.—Robert James Nixon, on August 28, 1953, at Petersham, New South Wales.

RITCHIE.—Harold John Ritchie, on September 8, 1953, at Sydney.

Diary for the Month.

SEPT. 22.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 23.—Victorian Branch, B.M.A.: Branch Council.
SEPT. 24.—New South Wales Branch, B.M.A.: Branch Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

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